5-5420-212-12-1

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

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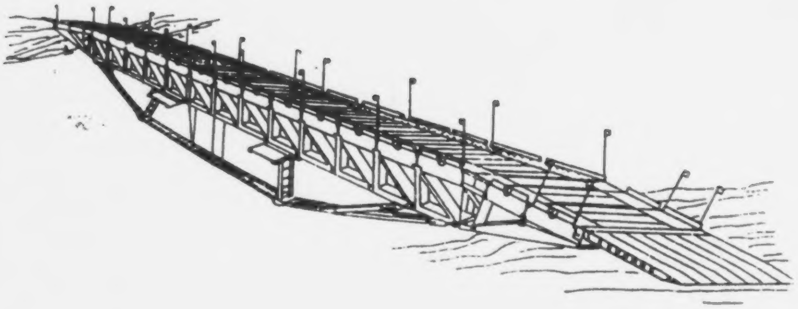

This copy is a reprint which includes current pages from Changes 1 and 2

LINK REINFORCEMENT SET FOR THE MEDIUM GIRDER BRIDGE

(5420-01-139-1503)

HEADQUARTERS, DEPARTMENT OF THE ARMY

5 OCTOBER 1984

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CHANGE
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 14 April 1986

Operator and Organizational Maintenance Manual

LINK REINFORCEMENT SET, FOR THE MEDIUM GIRDER BRIDGE
NSN 5420-01-139-1503

TM 5-5420-212-12-1, 5 October 1984, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
iii and iv	iii and iv
1-3 through 1-6	1-3 through 1-6
1-9 and 1-10	1-9 and 1-10
1-13 through 1-20	1-13 through 1-20
1-23 through 1-28	1-23 through 1-28
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2-247 through 2-256	2-247 through 2-256
2-261 through 2-268	2-261 through 2-268
E-1 and E-2	E-1 and E-2

READEX FICHE best copy available

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

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Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-25A, Operator and Organizational Maintenance requirements for Bridge, Girder, Medium (TM 5-5420-212 Series)

URGENT

TM 5-5420-212-12-1

CHANGE
NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 1 August 1985

Operator and Organizational Maintenance Manual

LINK REINFORCEMENT SET, FOR THE MEDIUM GIRDER BRIDGE
NSN 5420-01-139-1503

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Remove pages	Insert pages
a/b	a and b
2-27 and 2-28	2-27 and 2-28
2-151 and 2-152	2-151 and 2-152

2. Retain this sheet in front of manual for reference purposes.

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URGENT

WARNING

DEATH

or severe injury to personnel and damage to property may result if personnel fail to observe safety precautions.

Use extreme caution when welding MGB components. Some components contain a highly explosive preservative coating.

Use extreme caution when connecting bridge bays. Make sure of secure footing to prevent severe injury or death to personnel.

Exposure to hydraulic oil under pressure is hazardous. Exercise appropriate safeguards when working with pressurized systems.

When disconnecting any hydrualic line, open line slowly and protect face. Hydraulic oil can spray out due to residual pressure in system.

Dry cleaning solvent, P-D-680 or P-S-661, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100 degrees F to 138 degrees F (38 degrees C to 59 degrees C.)

Do not perform maintenance on the equipment while traffic is on bridge.

During loading and unloading of pallets, be sure that all personnel are clear before throwing the straps across the load.

During bridge assembly and disassembly, before removing captive pins to change heights, a panel pin must be placed through the nose roller and launching nose to prevent the nose from rolling.

When using compressed air, wear safety goggles or glasses and ensure air blast is not directed toward another person.

WARNING

WELDING HAZARDS

Improper welding of MGB components can result in death from toxic fumes or explosion of components. In addition, components can be weakened through improper welding.

WARNING

ROCKING ROLLERS

Rocking rollers must be in a down or locked position prior to disconnecting the assisting vehicle.

TECHNICAL MANUAL

No. 5-5420-212-12-1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 5 October 1984

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

LINK REINFORCEMENT SET, FOR THE MEDIUM GIRDER BRIDGE

NSN 5420-01-139-1503

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistake or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U. S. Army Troop Support Command, ATTN: AMSTR-MPS, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. A reply will be furnished directly to you.

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HOW TO USE THIS MANUAL

This manual (TM 5-5420-212-12-1) is written to cover all levels of expertise in the use and operation of the Link Reinforcement Set (LRS).

Any user will find that complete reading of this manual is not necessary (though advised) in order to construct any length or configuration of MGB. This applies primarily to the operation instruction.

The operation instructions are written so that procedural steps are provided for every length and configuration of bridge.

The following are examples provided to explain how users with different levels of expertise should use this manual.

EXAMPLE 1. An inexperienced user (in the use of the LRS) is given the mission to supervise construction of a 2E + 15 bay MGB with the LRS.

The user is advised to prepare by reading the procedures throughly before moving to the bridge site.

Since the mission is an MGB with LRS, the user must go to Chapter 2, paragraph 2-1. Being inexperienced the user will have to use the Step by Step Procedures which begin in Chapter 2, Section III, Paragraph 2-11.

The user should read the parts of Sections I and II that will be required prior to construction. For example, if the user will have to participate in the site selection, reconnaissance, and palletization, then these particular paragraphs should be reviewed. Of course, the user should read paragraphs 1-6 and 1-7 to become familiar with the LRS components.

The user will start construction with Step 1.a(1) and perform only these steps required for the length of bridge that is being built (2E + 15 bay). The rule to follow is: Perform the steps in order until a "PROCEED TO" is found that applies to the bridge being built. In this example, Steps 1.a. (1) thru (5) are performed and a "PROCEED TO" is found after Step (5). The user will follow the "PROCEED TO" instructions and immediately turn to Step (6). The user will not perform Steps (6) thru (9) as they pertain to other bridge lengths. Following the rule, the user performs Steps (10) thru (14), then 1.b(1) thru (3) and on to 2.a(1) thru (4). After Step (4) another "PROCEED TO" is found. Do as instructed, proceed to Step 2.a(10) and continue construction.

During the procedural steps, the user will find a "PROCEED TO" that will give the user a choice to make. An example can be found on page 2-11. In this case, the user proceeds to the step chosen, depending upon availability of equipment.

If the user becomes confused during reading of the steps, the Required Steps Per Bridge Length Tables can be used to determine exactly what steps are used for each bridge length. These tables are found in the Assembly - General paragraph.

EXAMPLE 2. An experienced user (in the use of the LRS) is given the mission to supervise construction of a 2E + 19 bay MGB with the LRS.

Again the user is advised to review portions of the manual that pertain to the bridge being built.

HOW TO USE THIS MANUAL — Continued

The only thing that the experienced user must use is the Building and Boom Tables (pages 2-32 thru 2-36). In this example the table required is found on pages 2-35 and 2-36. To use this table, find the bridge to be built and read down the column, performing steps as they are listed.

This manual can also be used by unit training sections to produce training packages for particular bridge sites. In many cases, a bridge unit has certain bridge sites that are available for training. In such a situation, the unit training section should determine the length of bridge required for that particular site. Then read through and extract for the manual all the pertinent information required to construct that length of bridge. When a platoon is given a mission to bridge that particular site, the training package can be issued by the training section to the platoon.

The recommended method of extracting the information is to copy the pages required and place them in a binder.

The important thing to remember about bridging with the MGB is to Practice Proper Planning Procedures to ensure Perfect Performance. Do not wait until arriving on the bridge site to determine what has to be done to accomplish the mission.

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CHAPTER 1

INTRODUCTION

Section I. General

1-1. SCOPE

a. This technical manual is for use in installing and maintaining the Link Reinforcement Set (LRS) used with the Medium Girder Bridge (MGB). Instructions provided cover installation, lubrication, preventive maintenance checks and services, troubleshooting, and maintenance procedures as allocated by the Maintenance Allocation Chart.

b. Instructions and information pertaining to the M817 truck and the M796 trailer, used as transport equipment for the LRS, are contained in TM9-2320-260-10 and TM9-2330-287-14.

1-2. MAINTENANCE FORMS AND RECORDS

Department of the Army forms and procedures used for Equipment Maintenance will be those prescribed by DA Pamphlet 738-750, the Army Maintenance Management System (TAMMS). This DA Pamphlet is available through: Commander USAAG Publications Center ATTN: AGDM-OD, 2800 Eastern Boulevard Baltimore, MD 21220.

1-3. ADMINISTRATIVE STORAGE

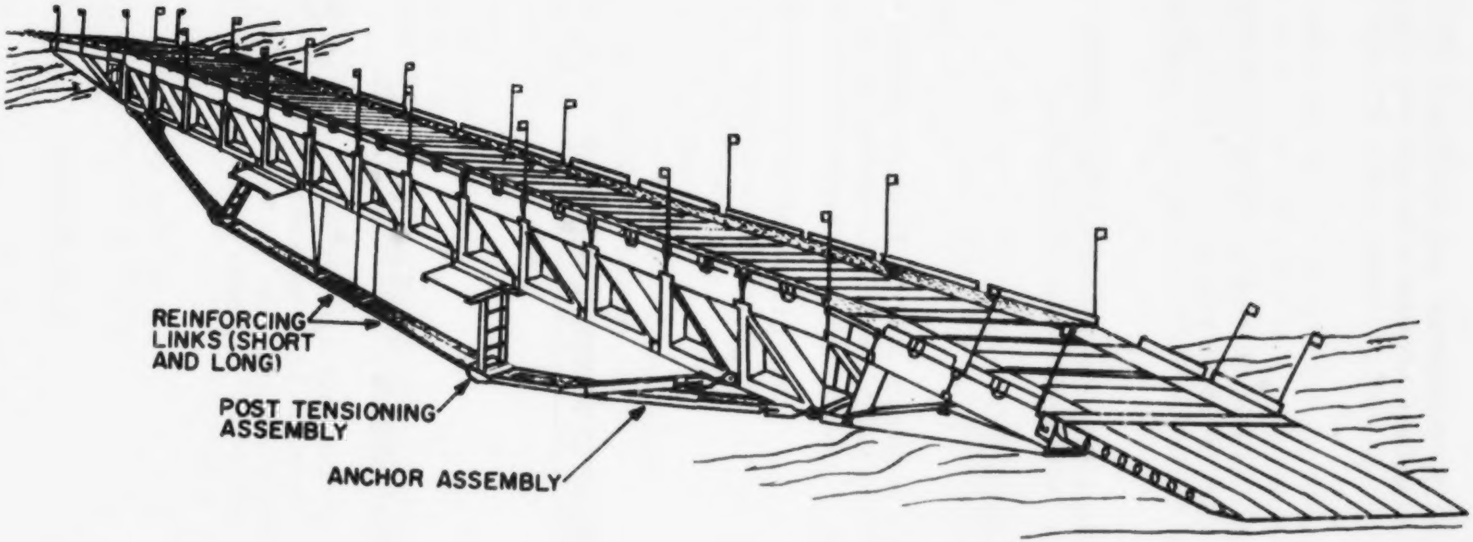
Refer to TM740-90-1.

1-4. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

Refer to TM-750-244-3.

1-5. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your set needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF368 (Quality Deficiency Report). Mail it to us at Commander, Headquarters, U.S. Army Troop Support Command, ATTN: AMSTR-QX, 4300 Goodfellow Boulevard, St. Louis, MO. 63120. We'll send you a reply.


REINFORCING LINKS (SHORT AND LONG)
POST TENSIONING ASSEMBLY
ANCHOR ASSEMBLY

LINK REINFORCED DOUBLE STORY MGB

Section II. EQUIPMENT DESCRIPTION

	PARAGRAPH	PAGE
Equipment Characteristics, Capabilities, and Features	1-6	1-3
Location and Description of Major Components	1-7	1-5

OVERVIEW

This section describes the Link Reinforcement Set used with the Medium Girder Bridge. Included are Equipment Characteristics, Capabilities, and Features.

1-6. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

a. The Link Reinforcement Set (LRS) illustrated has been developed to extend the single span capability of the MGB beyond Class 60 at 103 ft (31.4 m). The set contains all the components needed for use with two bridge sets to construct any length of reinforced Class 60 MGB from 109 ft (33.2 m) to 163 ft (49.7 m). The LRS consists of reinforcing links 12 ft (3.66 m) and 6 ft (1.83 m) long which are connected to form a pair of link chains, one beneath each bridge girder. The 6 ft, (1.83 m) links are provided for use in bridges that have an odd number of bays. The link chains are connected to the bottom panels at the ends of the bridge by an anchor assembly. The links are positioned below the bridge girders by reinforcing posts. These posts allow the system to be tensioned. The posts are pulled towards a vertical position by cable pullers. These pullers are fitted to frames in which the top of the posts can slide, then the posts are pinned at fixed points providing the correct tension. The amount of tension is the minimum needed to remove slack from the bridge and reinforcing set.

b. The reinforcing is added to the bridge during normal bridge construction. The size of the work party has to be increased from 24 to 32 personnel. This permits addition of the LRS to the bridge without a considerable increase in construction time. A capsill roller beam (CRB) is used when constructing 2E + 16 through 22 bay bridges with link reinforcement. The end anchor and links are added to the bridge as the bottom panels pass the LRB/CRB. Additional reinforcement is added as the bridge is boomed forward. When all reinforcement is in place, the bridge can be jacked down. Before decking and ramping, the reinforcement is tensioned using the cable pullers.

c. The table below gives bridge lengths for specified gap widths.

Table 1-1 Reinforced DSB Length vs Gap Width

Bridge Length		2E + No. of Bays*	Maximum Gap Width	
Feet	Meters		Feet	Meters
109	33.2	13	103	31.4
115	35.1	14	109	33.2
121	36.9	15	113**	34.4**
127	38.7	16	121	36.9
133	40.5	17	127	38.8
139	42.4	18	133	40.5
145	44.2	19	139	42.5
151	46.0	20	145	44.2
157	47.9	21	148.75	45.3
163	49.7	22	152.5	46.5

NOTE

*** DSB is described "2E + No. of Bays", (2 Ends of bridge + No. of Bays).**

****Due to launching nose length and configuration.**

d. The work party recommended for all reinforced MGBs is 1 NCO/24 personnel for the bridge and 8 personnel for the link reinforcement set. Increasing or decreasing the size of the work party will considerably increase building times. The number of personnel required for the different bridge lengths is the number necessary to assemble/disassemble the bridge in the most efficient manner.

e. Approximate building times for various bridges are given in Building Times Table. Time is figured from arrival on site to the opening of the bridge.

Table 1-2 Building Times (Good Conditions)

	Bridge Length		
	Double Story (with reinforcement)		
	2E + 13 Bay	2E + 18 Bay	2E + 22 Bay
Time by Day (hours)	2	2-1/4	2-1/2
Time by Night (hours)	2-1/2	2-3/4	3

For untrained troops, increase time by 20 per cent.
For inclement weather, increase time by 30 per cent.

1-7. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

a. Link Reinforcement Components. Each LRS component is illustrated and its function explained. Maintenance Chapters of this manual contain detailed descriptions of the LRS components.

(1) Anchor Assembly (AA).

This assembly anchors the chain of links to two of the bottom panel pins at each end of the bridge.

(a) Each anchor assembly is brought to the site assembled with the fork end anchors folded in the transit position.

NOTE

Do not switch the parts of one anchor assembly with the parts of another.

(b) To connect the assembly to the bridge, the fork end anchors are swung over the projecting ends of the bottom panel pins. The anchors are then secured by bracing pins and retainer clips.

(c) The anchor assembly is carried by four personnel.

WARNING

Use extreme care when handling, this is a multi-hinged component. Serious bodily injury may occur from improper handling.

FORK END ANCHORS. Connect to the projecting ends of the panel pins in the bottom panels at the ends of the bridge. There are two fork end anchors on each of the two anchor links. The anchors can be secured in either the transit or operational position with bracing and retainer clips provided.

NOTE

Do not use these pins in any other component.

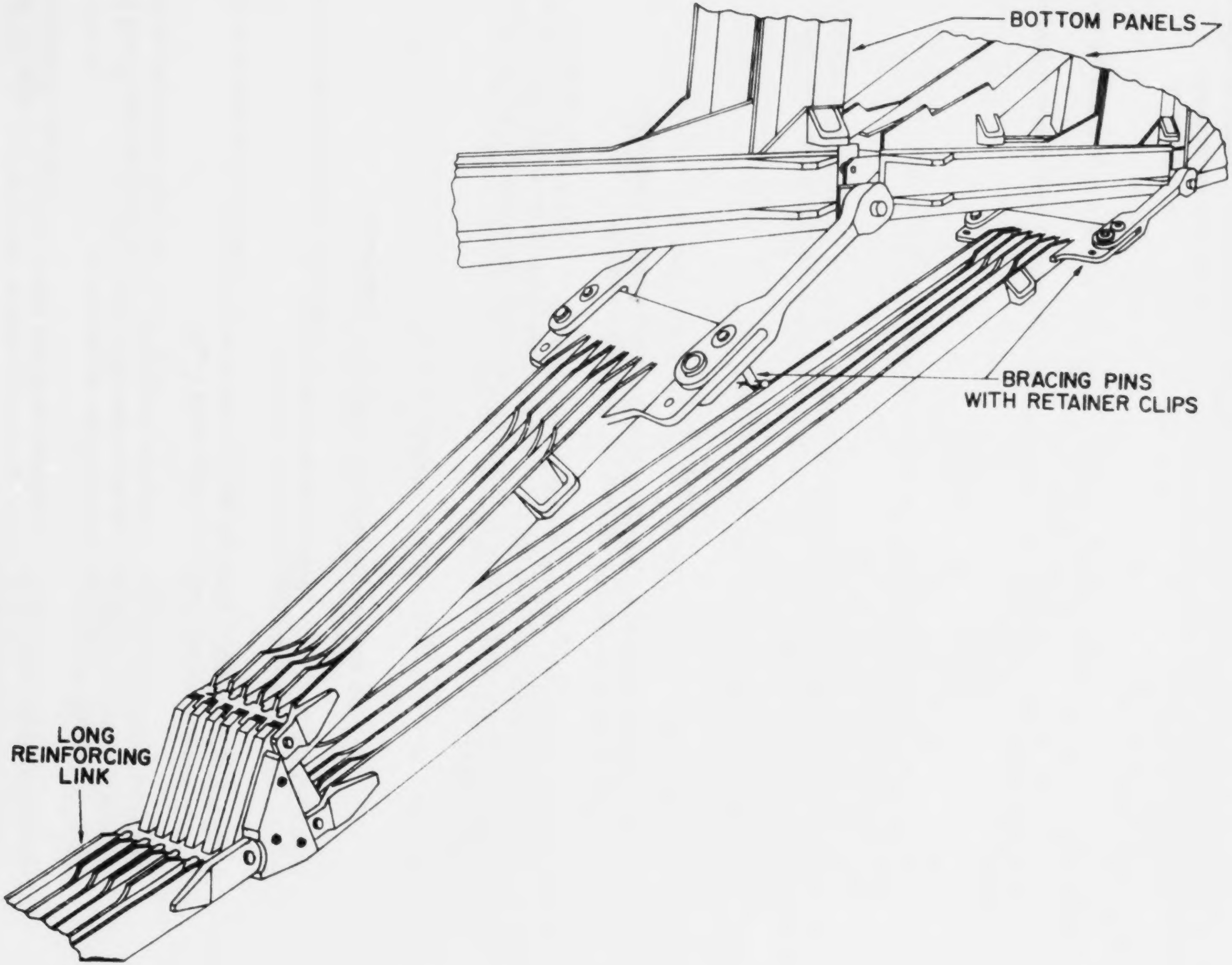
LINK ANCHOR SHORT. Takes the tension load from the anchor junction block and transfers it to the fork end anchors and the bottom panel pins.

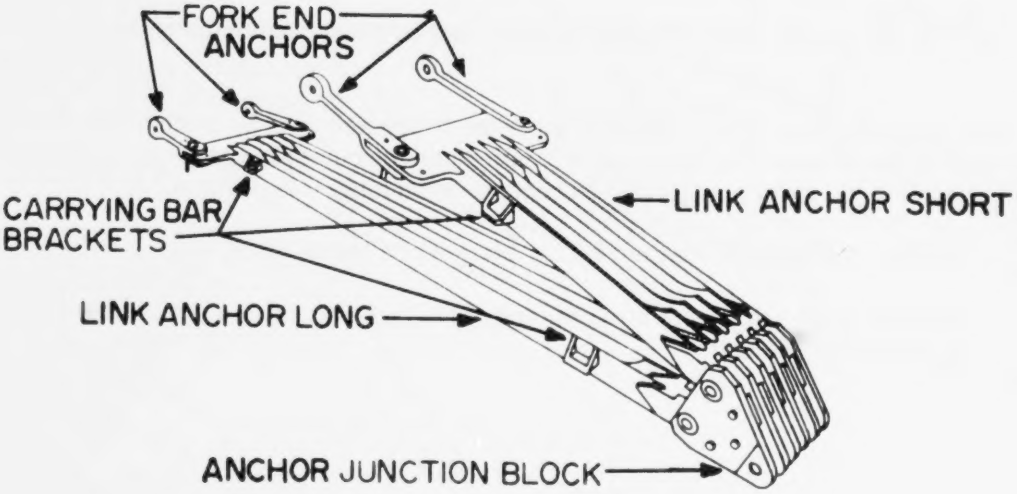
LINK ANCHOR LONG. Takes the tension load from the anchor junction block and transfers it to the fork end anchors and the bottom panel pins.

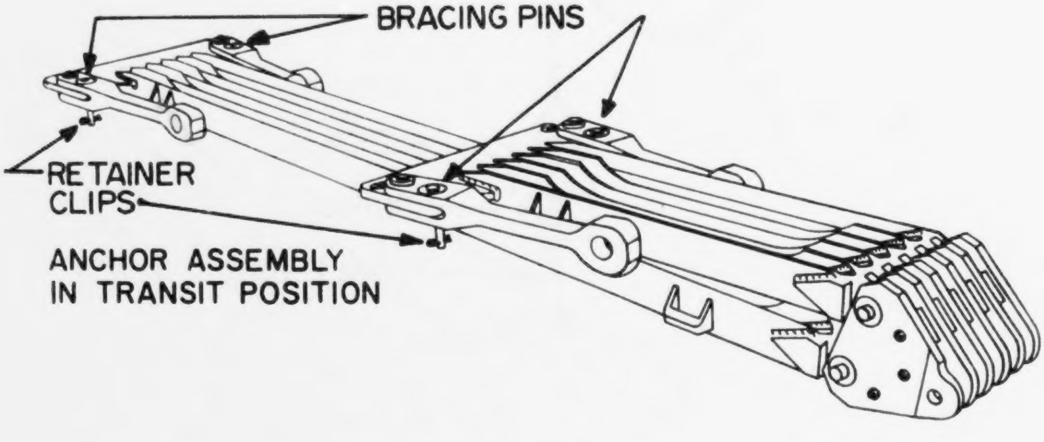
ANCHOR JUNCTION BLOCK. Connects the link anchors to the long reinforcing link attached to the post tensioning assembly. The block has a guide system built into it which allows the nose pin to be inserted easily when connecting the reinforcing link.

CARRYING BAR BRACKETS. The anchor assembly has six brackets, four on the link anchor long and two on the link anchor short. The two brackets on the link anchor short are used only to position the link for connection to the pins in the bottom panel.

BRACING PIN HOLES. For positioning of the fork end anchors in either the transit or operational position. These pins are always inserted from the top of the fork.


BOTTOM PANELS
BRACING PINS WITH RETAINER CLIPS
LONG REINFORCING LINK


FORK END ANCHORS
CARRYING BAR BRACKETS
LINK ANCHOR SHORT
LINK ANCHOR LONG
ANCHOR JUNCTION BLOCK


BRACING PINS
RETAINER CLIPS

ANCHOR ASSEMBLY IN TRANSIT POSITION

(2) Anti-flutter Tackle.

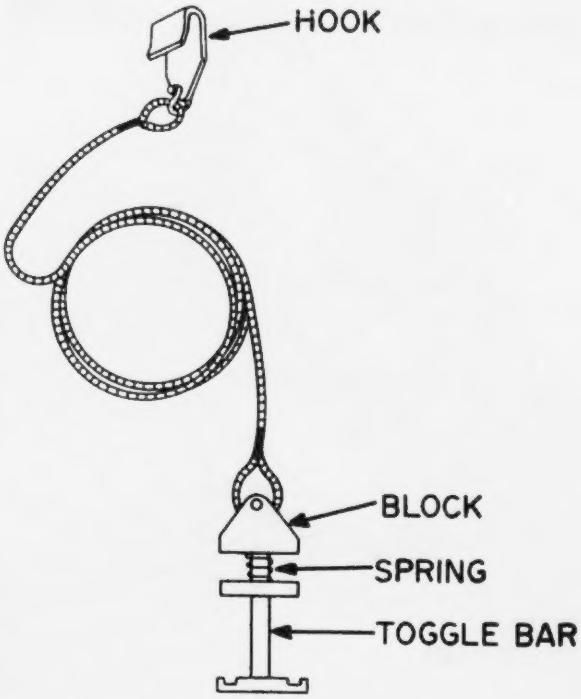
The anti-flutter tackle is used to reduce vibrational flutter which may be caused in the bridge by crossing vehicles or winds.

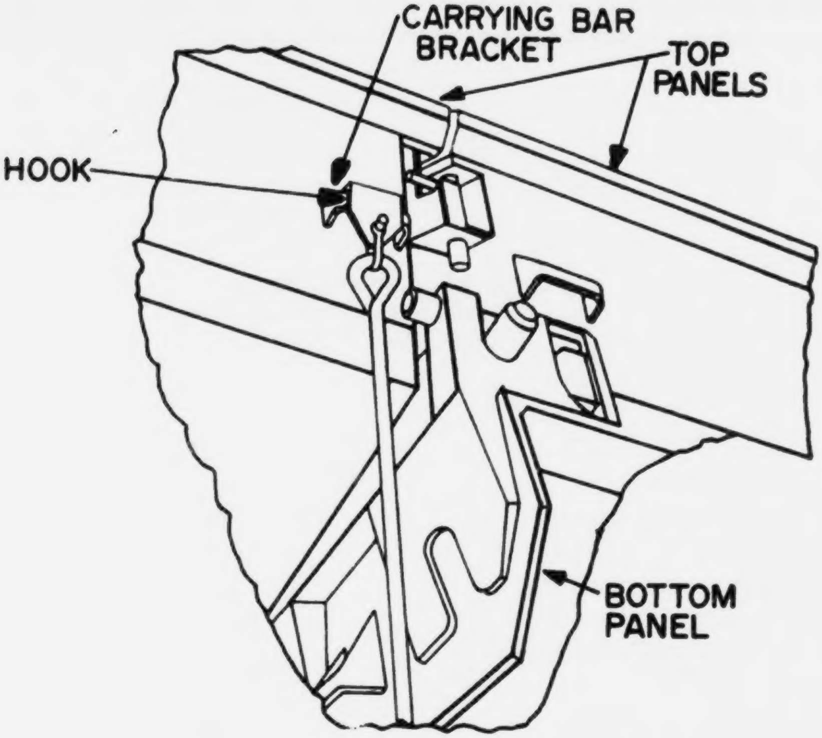
(a) For all bridges two anti-flutter tackle should be fitted under each girder approximately mid-span.

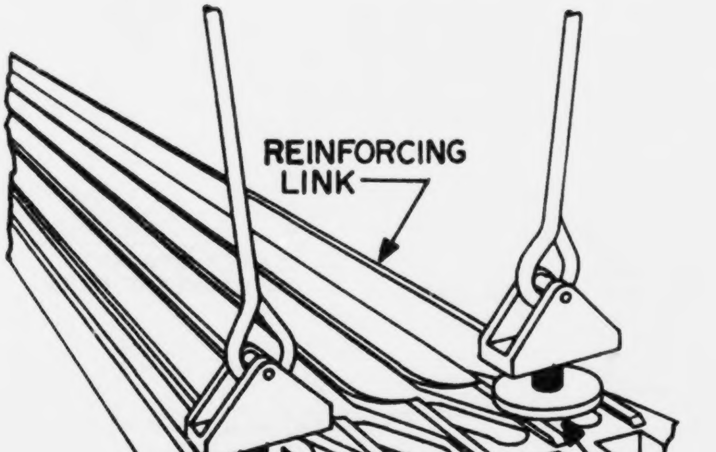
(b) The anti-flutter tackle is connected to the bridge and links by placing the hook end in a top panel carrying bar bracket. The toggle bar is inserted into the outer elongated slot of the link. The block is pushed against the spring and rotated 90 degrees which locks it in position.

HOOK. Connects to the carrying bar bracket of a top panel.

TOGGLE BAR. Connects the lower end of the tackle to the link. It is spring loaded to keep it in the locked position.

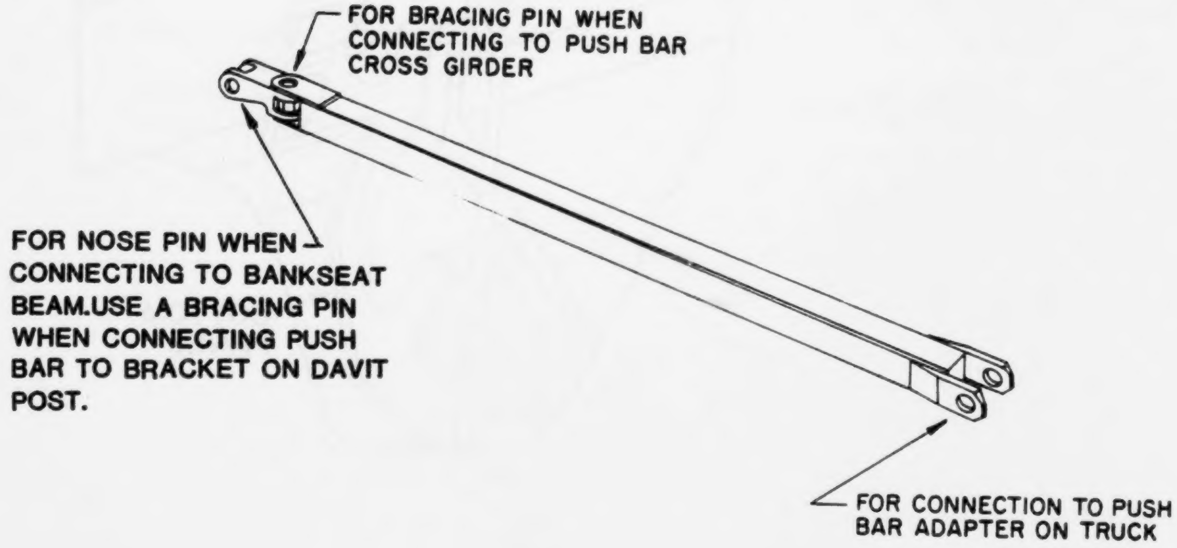


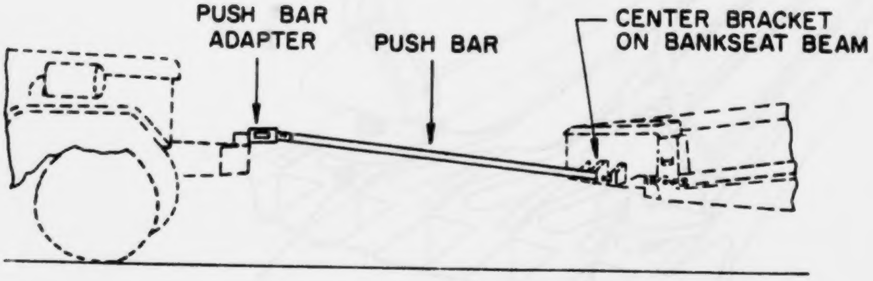

CARRYING BAR
BRACKET
TOP
PANELS
HOOK
BOTTOM
PANEL

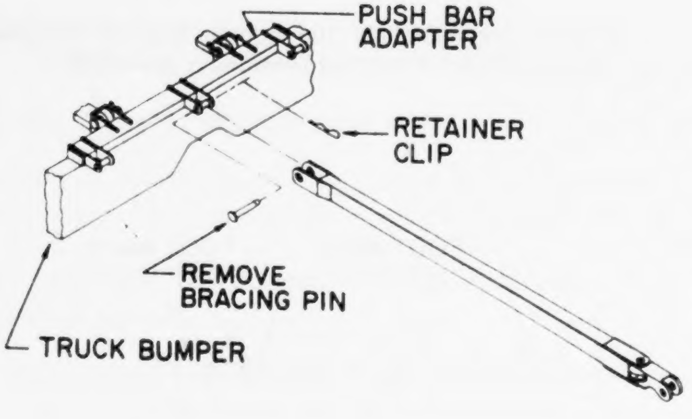

REINFORCING
LINK
TOGGLE
BAR
BLOCK

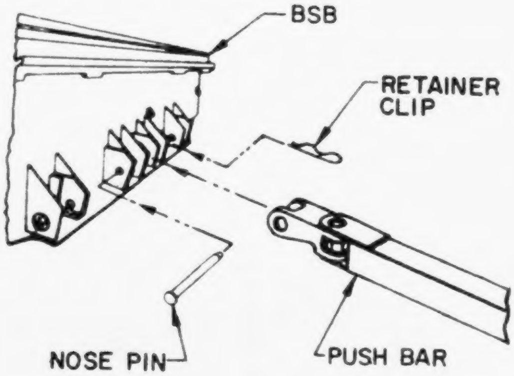
(3) Push Bar (Long).

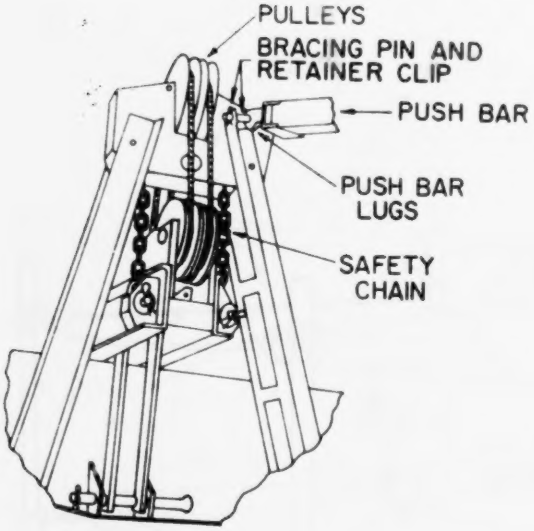
Used for final launch of all link reinforced MGBs. Also used to boom reinforced bridges over 13 bays long. Used between davit posts and push bar adapter on truck.

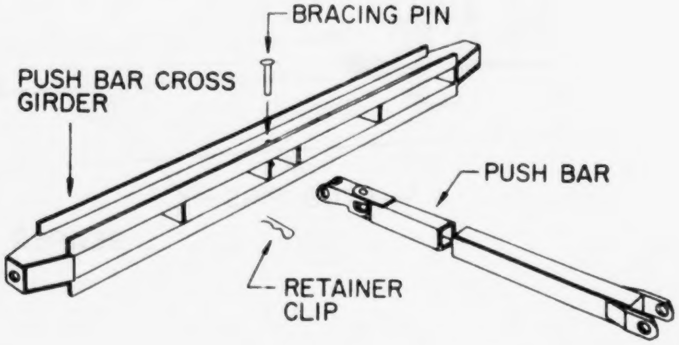

FOR BRACING PIN WHEN CONNECTING TO PUSH BAR CROSS GIRDER
FOR NOSE PIN WHEN CONNECTING TO BANKSEAT BEAM.USE A BRACING PIN WHEN CONNECTING PUSH BAR TO BRACKET ON DAVIT POST.
FOR CONNECTION TO PUSH BAR ADAPTER ON TRUCK


PUSH BAR ADAPTER
PUSH BAR
CENTER BRACKET ON BANKSEAT BEAM


PUSH BAR ADAPTER
RETAINER CLIP
REMOVE BRACING PIN
TRUCK BUMPER

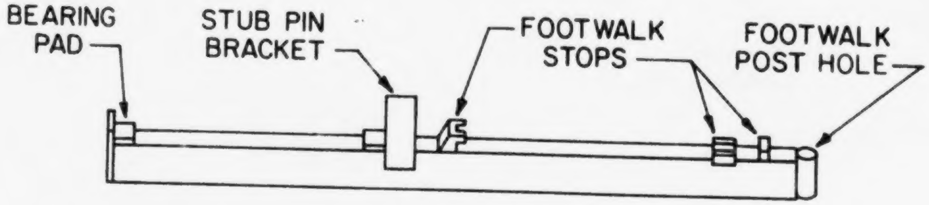

BSB
RETAINER CLIP
NOSE PIN
PUSH BAR

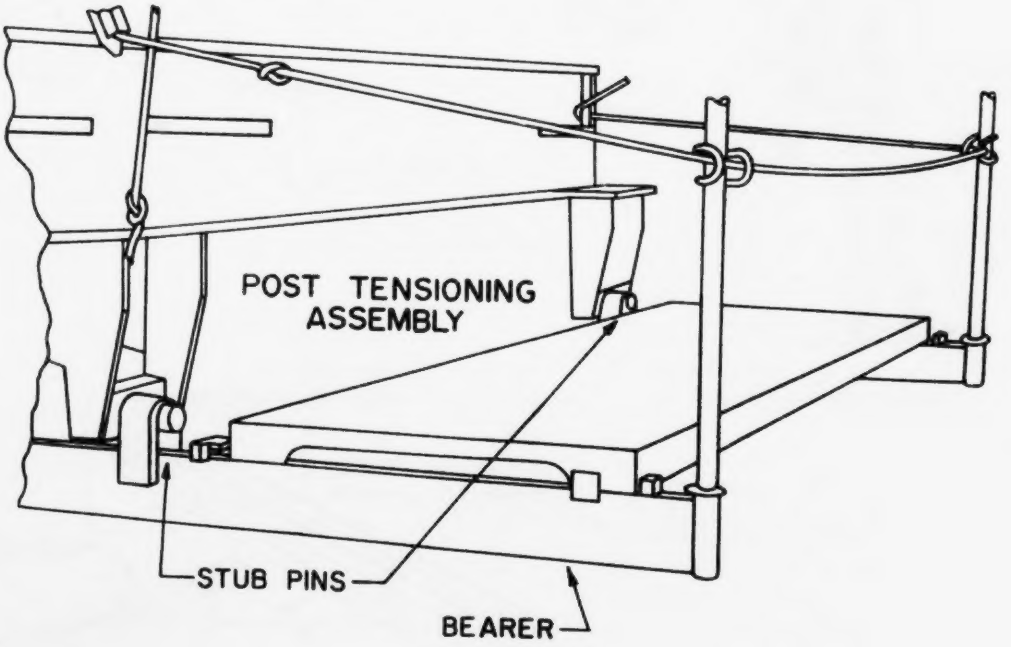

PULLEYS
BRACING PIN AND RETAINER CLIP
PUSH BAR
PUSH BAR LUGS
SAFETY CHAIN


BRACING PIN
PUSH BAR CROSS GIRDER
PUSH BAR
RETAINER CLIP

(4) Footwalk. Bearer.

Used to support footwalk section on post tensioning assembly. The stub pin bracket is slipped over the stub pin, and the bearing pad rests against the bottom of the post tensioning assembly.


BEARING PAD
STUB PIN BRACKET
FOOTWALK STOPS
FOOTWALK POST HOLE


POST TENSIONING ASSEMBLY
STUB PINS
BEARER

(5) Jacking Bracket.

Connects to bankseat beam to provide a lifting point and support base for cable pullers. The cable pullers are operated from it, to lift or lower the end of bridge.

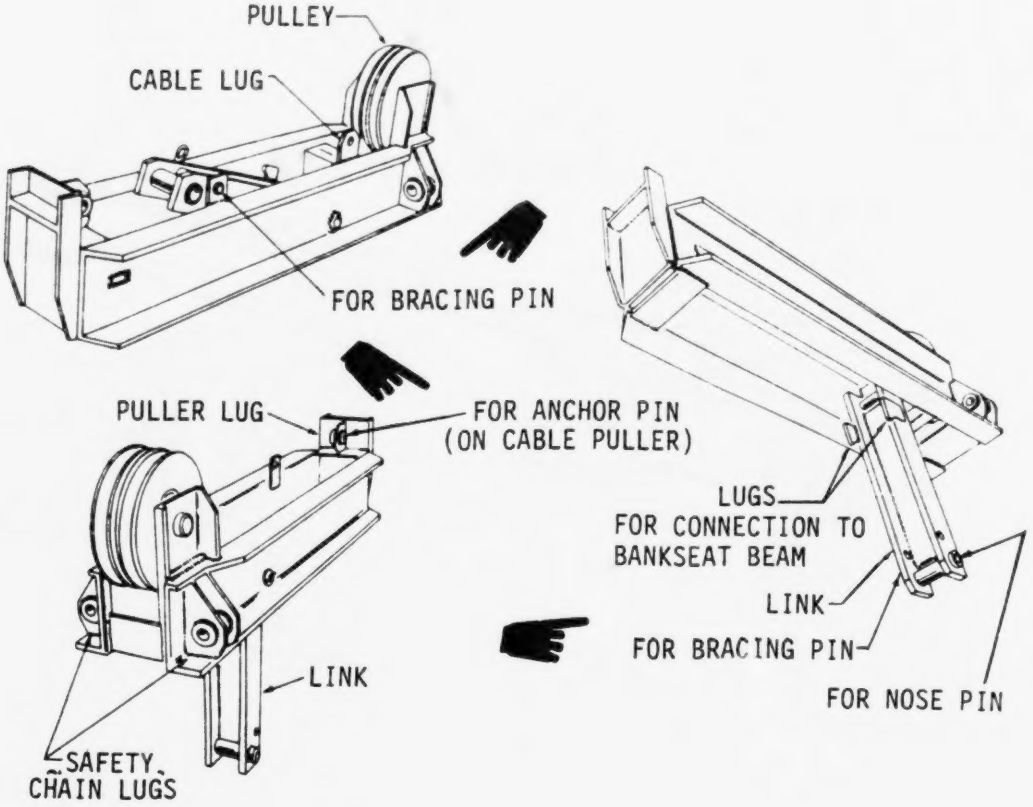
LINK. Pins to bankseat beam with a nose pin, secure with a retainer clip.

SAFETY CHAIN LUGS. For connection of safety chains on davits to jacking bracket. Use a bracing pin and retainer clip to secure chains to brackets.

CABLE LUG. For connection of cable from puller to jacking bracket. Use a bracing pin and retainer clip.

PULLER LUG. For pinning of puller to bracket. Use the anchor pin in the cable puller to secure puller to jacking bracket. DO NOT USE any other type of pin.

PULLEYS. For reeving of puller cables.


PULLEY
CABLE LUG
FOR BRACING PIN
PULLER LUG
FOR ANCHOR PIN (ON CABLE PULLER)
LUGS FOR CONNECTION TO BANKSEAT BEAM
LINK
FOR BRACING PIN
FOR NOSE PIN
LINK
SAFETY CHAIN LUGS

(6) Capsill, Bridging.

Used in the MGB adjustable support to form the heavy duty capsill roller beam (CRB) needed in the 19 thru 22 bay reinforced double story.

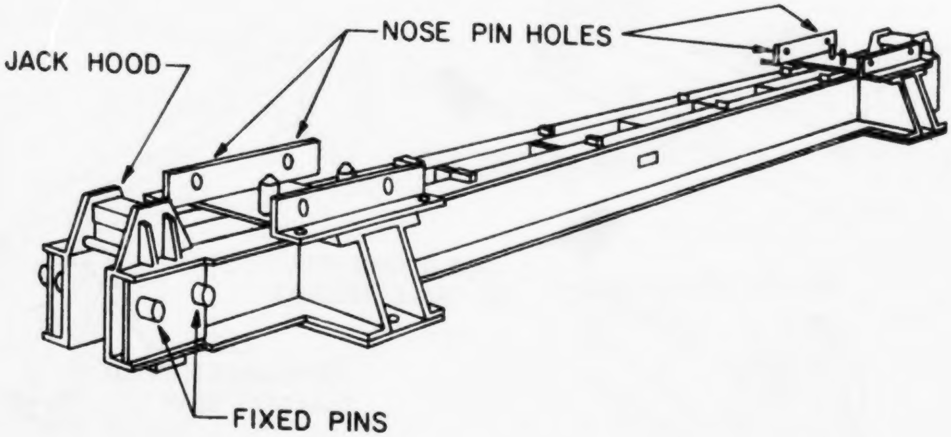
(a) Rocking rollers used in capsill are separate items that are pinned into the capsill with nose pins.

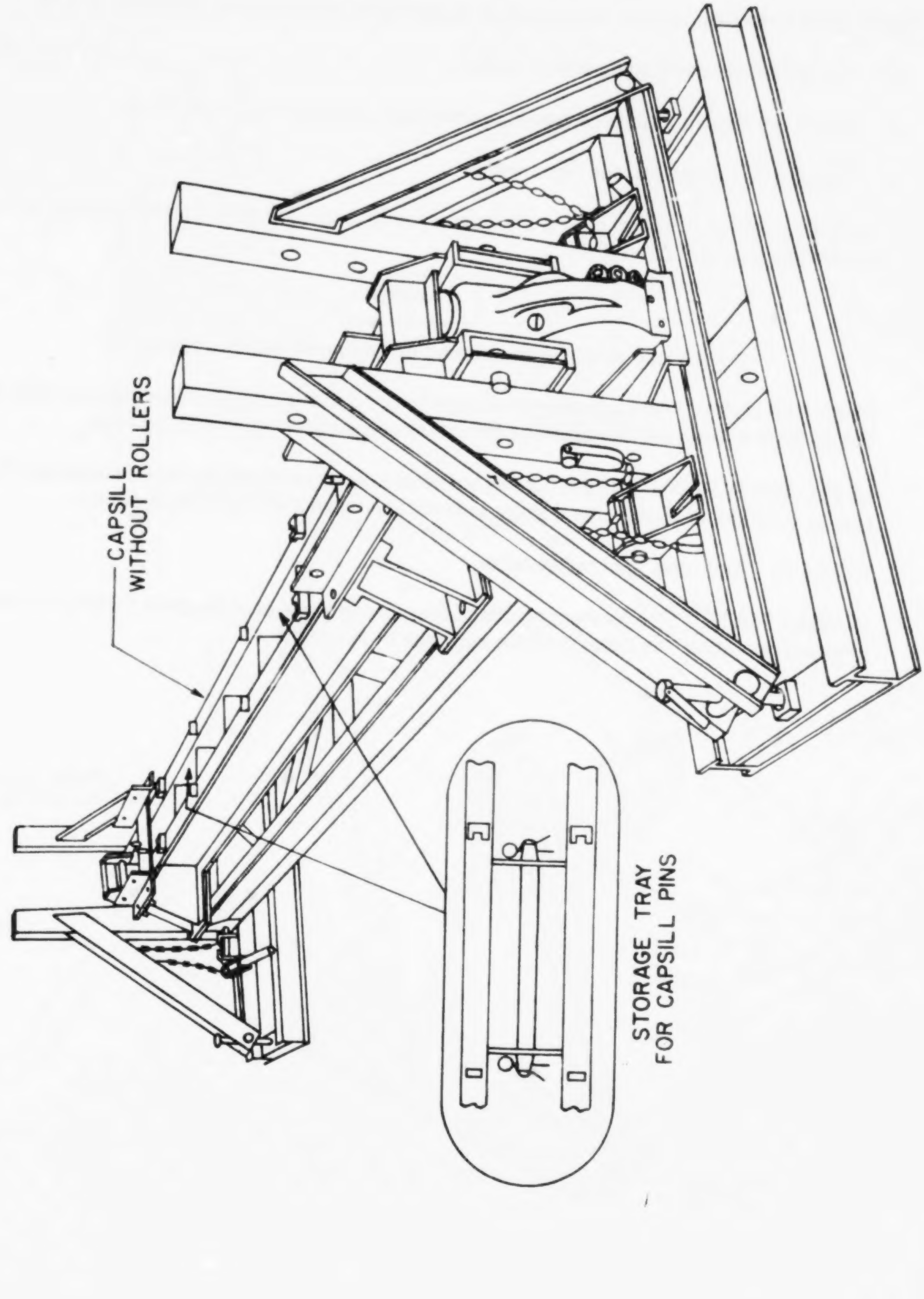
(b) The capsill is carried by four personnel. When rollers are installed it will take eight personnel to carry it.

JACK HOOD. For positioning of the jack used to raise or lower CRB. These hoods are fixed, they do not move like the hoods in the roller beam.

FIXED PINS. These pins hold the capsill into the adjustable support posts.

NOSE PIN HOLES. Nose pins are inserted in these holes to secure rocking roller to capsill.




CAPSILL WITHOUT ROLLERS
STORAGE TRAY FOR CAPSILL PINS

(7) Davit Post Assembly.

Used to raise or lower bridge as needed when removing or installing the LRB/CRB or JRB.

(a) Two davits are used at the end of bridge.

(b) Davits will allow bridge to be raised or lowered a maximum of 4.3 ft (1.3 m).

(c) The davit is carried by four personnel.

SAFETY CHAINS. These chains are connected to jacking bracket before removing or installing the jacking roller beam.

CAUTION

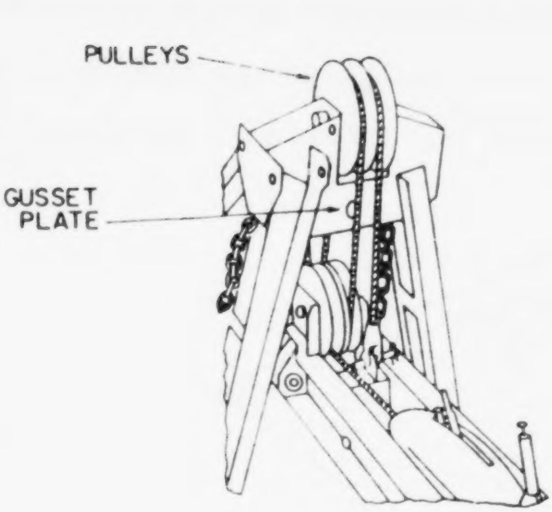
Do not use davits with missing or damaged safety chains.

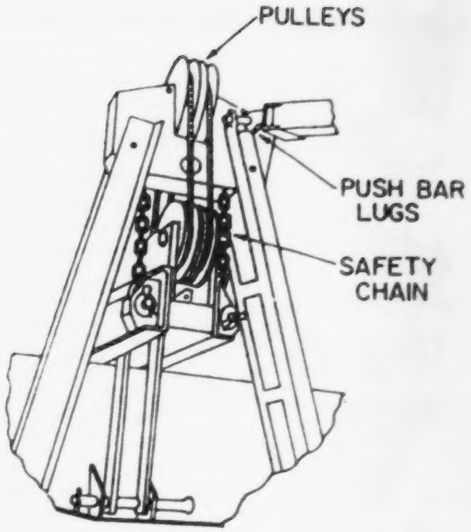
PUSH BAR LUGS. For connection of the short or long push bars from launch vehicle. This vehicle will be used to keep the davit pulleys vertical above the jacking bracket pulleys.

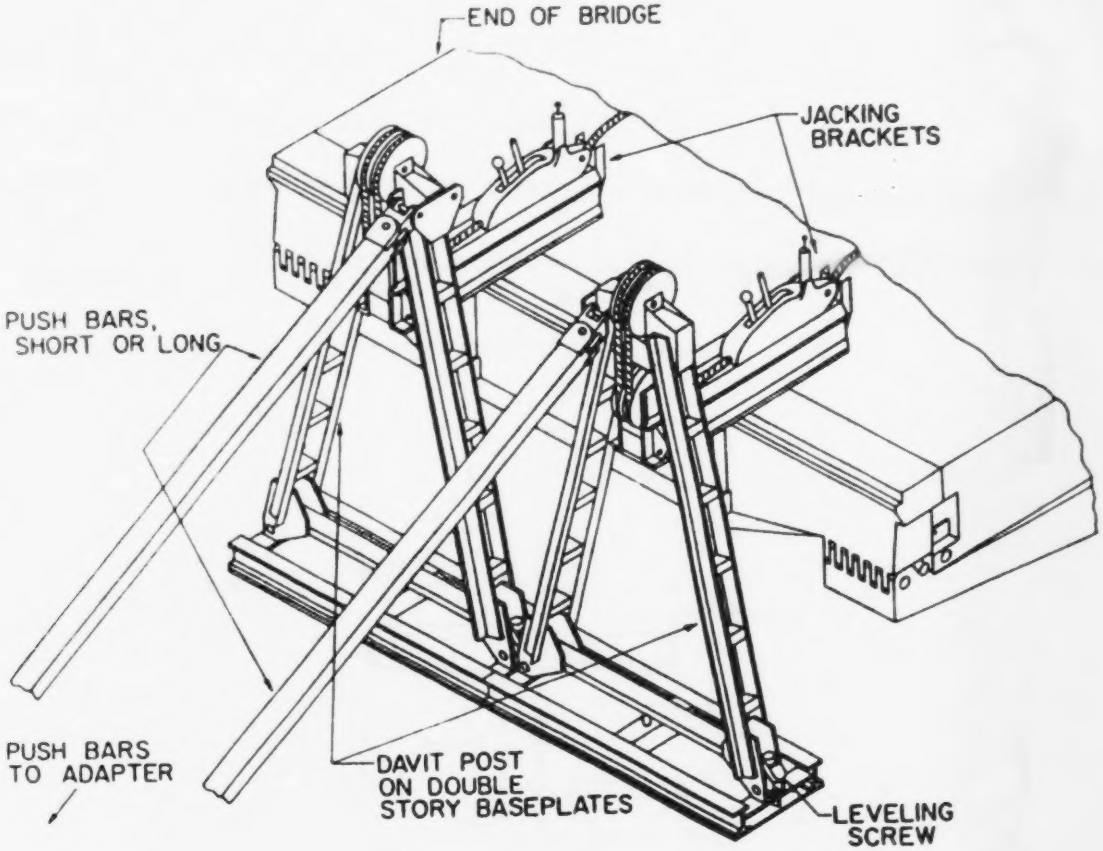
LEVELLING SCREWS. These screws are used to level the davits over the baseplates. Packing can be used under baseplates if screws do not level davits as much as needed.

PULLEYS. For reeving of puller cable.

GUSSET PLATE. The connecting plate between the two legs of the davit. During the raising or lowering operation, the cable must be kept free of this plate.

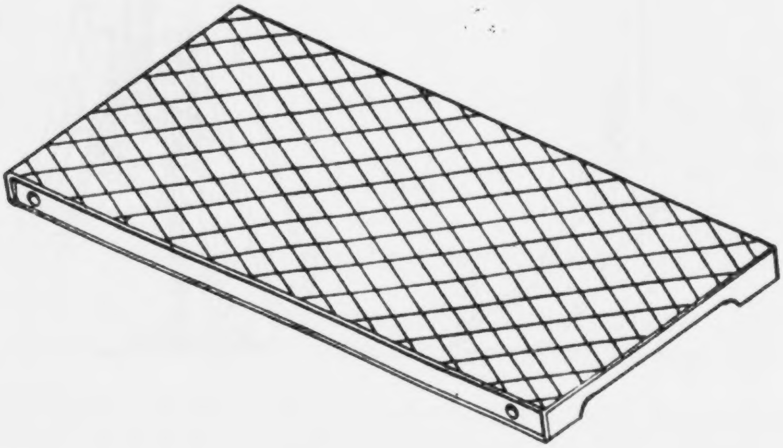

PULLEYS
GUSSET PLATE


PULLEYS
PUSH BAR LUGS
SAFETY CHAIN


END OF BRIDGE
JACKING BRACKETS
PUSH BARS, SHORT OR LONG
PUSH BARS TO ADAPTER
DAVIT POST ON DOUBLE STORY BASEPLATES
LEVELING SCREW

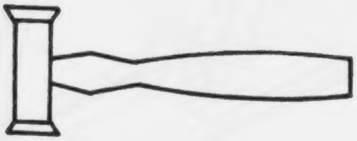
(8) Footwalk.

Used as a platform for the post tensioning work party to stand on when needed to operate the cable pullers.



(9) Nylon Faced Hammer.

Used on bracing pins in fork end anchors. Can be used on other small pins.

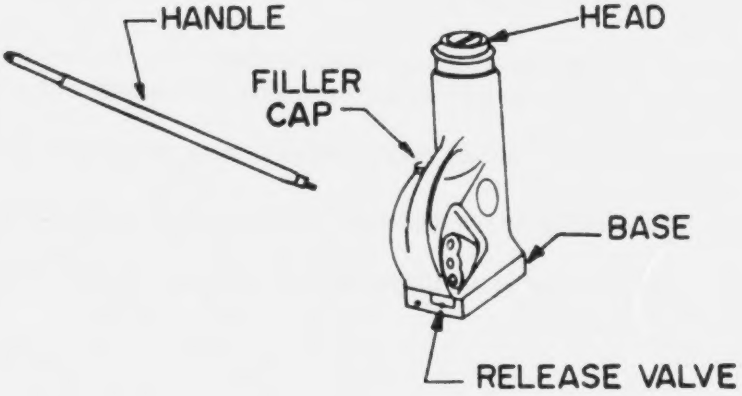


(10) Hydraulic Jack (20 ton).

Used in the landing roller pedestal (LRP) Mk2 to raise or lower the far end of reinforced double story bridges.

The data plate identifies it as a 20 ton jack.

The 20 ton jack can be identified by its Silver-grey paint and identification plate.

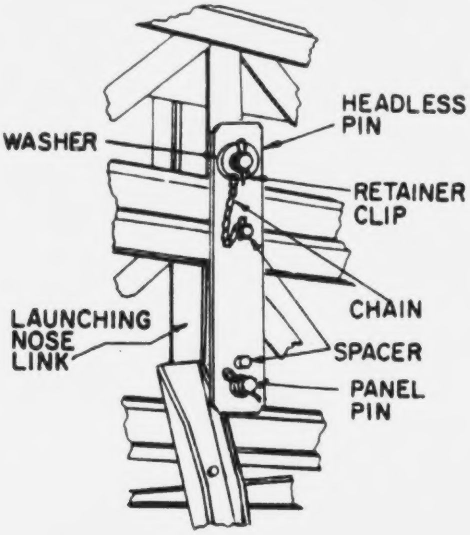

HANDLE
HEAD
FILLER CAP
BASE
RELEASE VALVE

(11) Link, Launching, Two Tier (Launching Nose Link) (LNL).

Connects the second story launching nose to first story and to the launching nose roller. Used on the longest double story bridges.

WASHER. Used on headless pin with retainer clip.

SPACER. Provides correct spacing from nose section.


HEADLESS PIN
WASHER
RETAINER CLIP
CHAIN
LAUNCHING NOSE LINK
SPACER
PANEL PIN

(12) Long Reinforcing Link.

Used to reinforce double story bridges.

(a) Connected to other reinforcement components with nose pins. The pin jaws of each link have a guide system built into them. These guides allow easy insertion of the nose pin.

(b) A long link connects the anchor junction block to the post tensioning assembly.

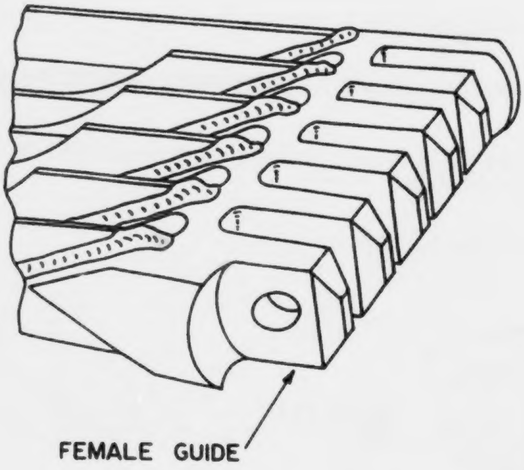
(c) The long link is carried by two personnel.

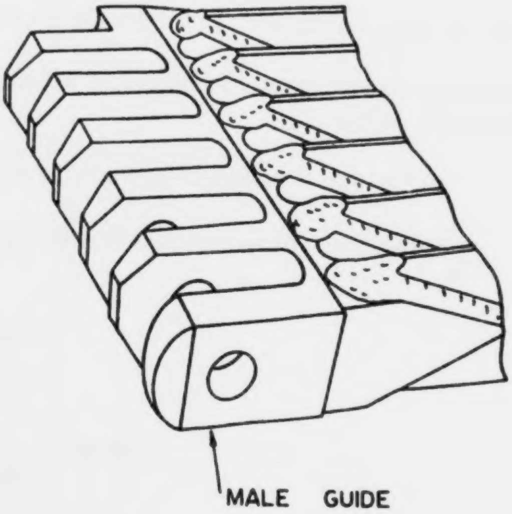
PIN JAWS. Takes tension load when connected by nose pin to another link in the link chain Nose pin is inserted from the outside toward the inside and secured with a retainer clip.

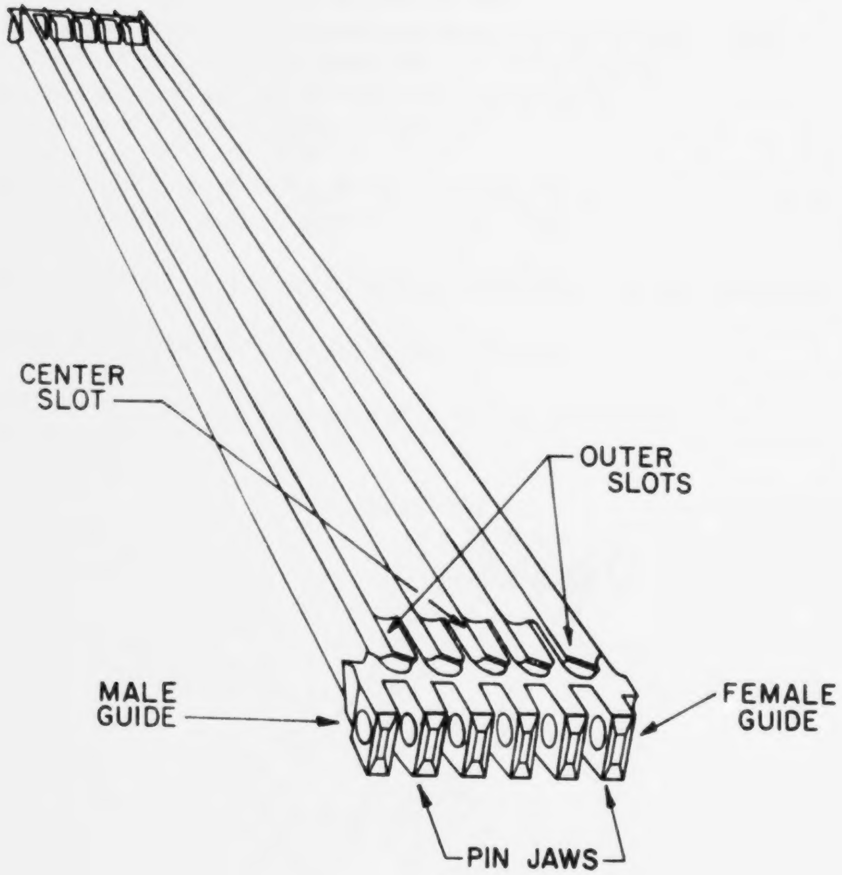
MALE AND FEMALE GUIDE. Allows easy insertion of nose pin used to connect links.

OUTER SLOTS. For insertion of the toggle bar that connects the anti-flutter tackle to the link.

CENTER SLOT. For insertion of the toggle bar that connects the light tackle to the link.






CENTER SLOT
OUTER SLOTS
MALE GUIDE
FEMALE GUIDE
PIN JAWS

(13) Short Reinforcing Link.

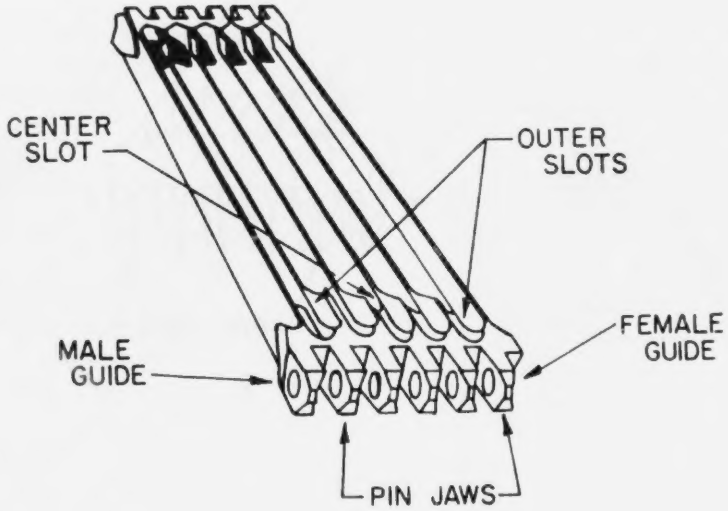
Used in double story bridges that contain an odd number of bays.

(a) Connects to long links with nose pins. The pin jaws of each link have a guide system built into them. These guides allow easy insertion of the nose pin. Nose pin is inserted from the outside toward the inside and secured with a retainer clip.

(b) The short link is carried by one person.

The parts of the short link listed below are similar to those of the long link and they perform the same functions.

PIN JAWS
MALE AND FEMALE GUIDE
OUTER SLOTS
CENTER SLOTS



(14) Landing Roller Pedestal (LRP) Mk2.

The landing roller pedestal holds the landing roller and receives the launching nose on the far side of the gap. The Mk2/LRP is used for all link reinforced bridges. The height of the LRP is adjusted with a hydraulic jack (20 ton).

WARNING

Personnel are advised to use care when the pedestal is being raised or lowered. Serious bodily injury may result if LRP is improperly operated.

LUGS. Holds rear of landing roller in position.

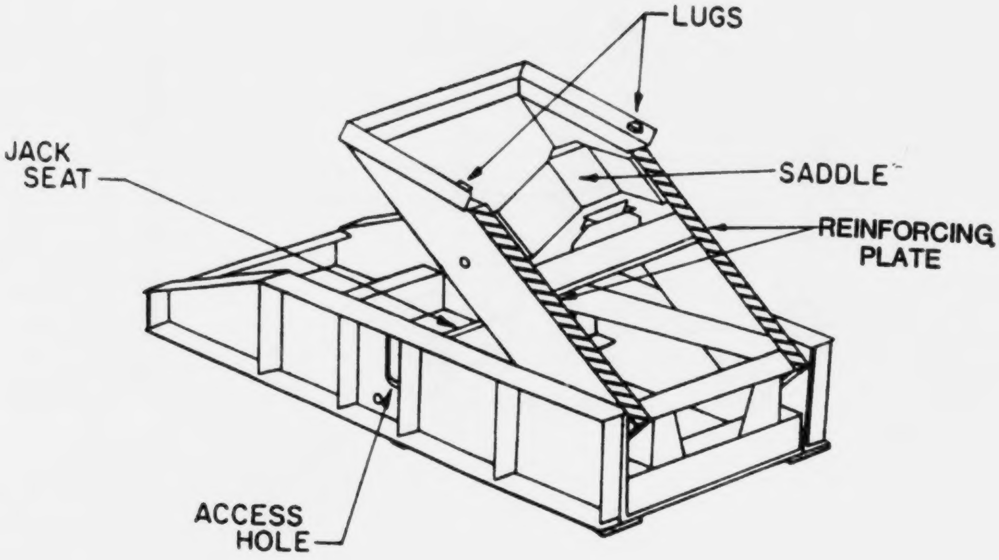
JACK SEAT. Base for hydraulic jack used to adjust height of upper frame. Pivot mounted to keep jack seated solidly in frame during operation.

SADDLE. Fits head of jack. Pivot mounted to keep saddle on jack head during operation.

ACCESS HOLES. For safe operation of hydraulic jack.

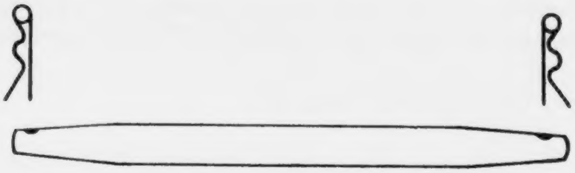
REINFORCING PLATE. This is plate that is welded to standard LRP to reinforce it. It is one way of identifying a Mk2.

REINFORCING PLATE



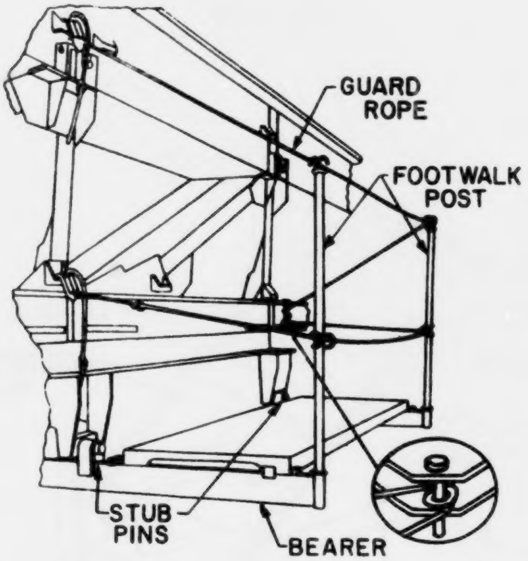
(15) Capsill Pin.

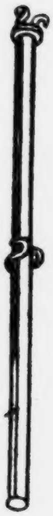
This is used to support the jack seat in certain positions in the adjustable support. The capsill pin is required for use when constructing 2E + 16 thru 2E + 22 bay bridges with link reinforcement.



(16) Footwalk Post.

For use in providing a guard rail on post tensioning work platform.


GUARD ROPE
FOOTWALK POST
STUB PINS
BEARER



(17) Post Tensioning Assembly.

This assembly is used to remove slack from the complete reinforcement system. When the tension post is correctly positioned, nearly vertical, the entire system is tensioned and the bridge is reinforced.

(a) There are four assemblies in a bridge. Before loading on a pallet, two must be assembled as right hand, and two as left hand assemblies. This is done by positioning of the cable pullers in one or the other of the alternate positions on the frame.

(b) The tensioning post assembly is equipped with six carrying bar brackets which are used to carry it. The brackets are used as needed to connect the assembly to the bridge.

POST. Allows tensioning of the system as they are pulled to a near vertical positioning under the bridge.

OPEN JAW BRACKETS. Connects the post tensioning assembly to the panel pins in the lower flange of the bottom panel. The jaws snap into position around the pins and then they are secured with retainer clips.

CARRYING BAR BRACKET. For connection of carrying bars used to carry panel. Three brackets on each side. The post assembly is carried by six personnel.

PULLER BRACKET. For connection of cable puller that is used to tension post.

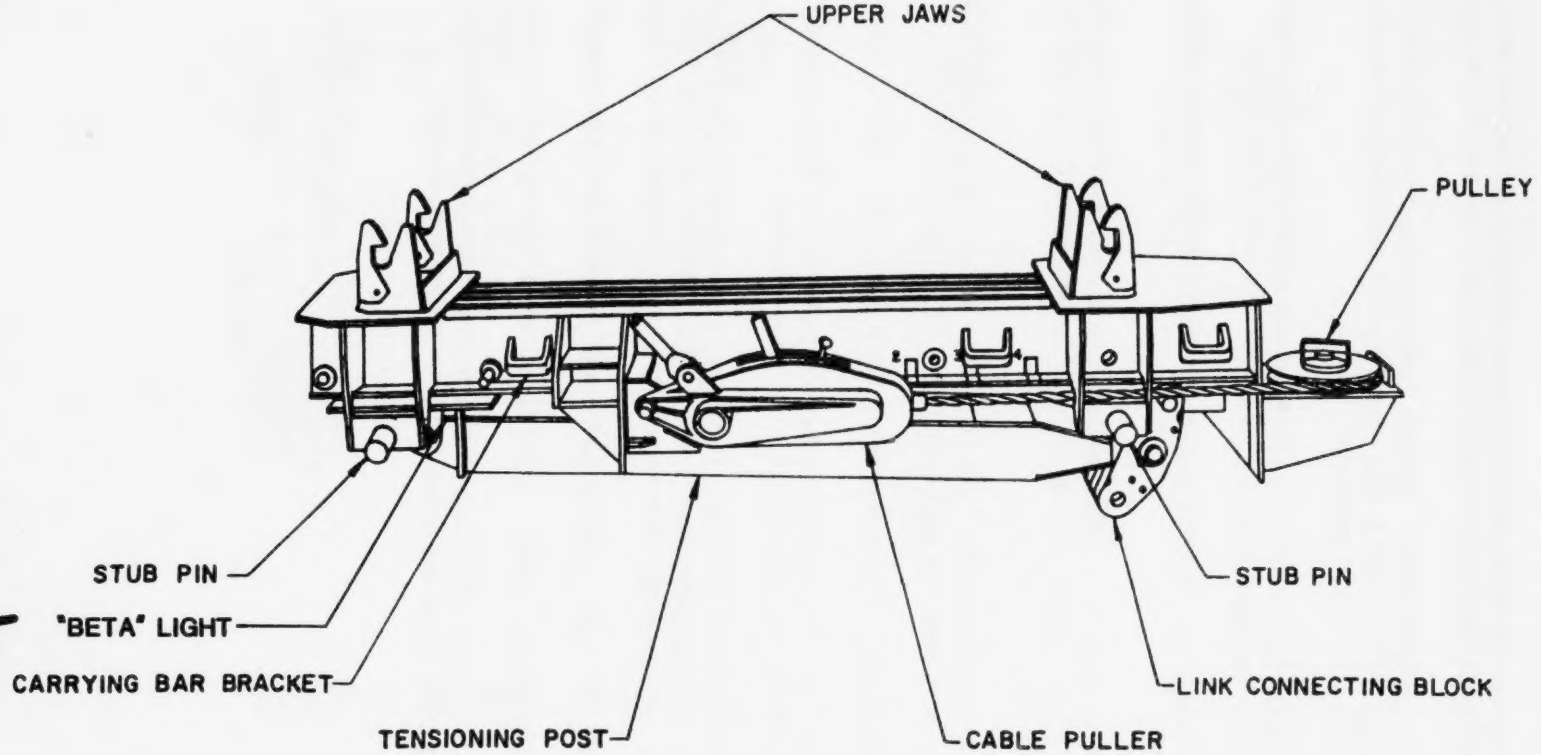
TACKLE BLOCK. For reeving of cable from puller to post. Block is placed in either one of two positions making the assembly either right of left handed.

TENSIONING CHECK MARKS. These are marks painted on the tensioning frame to insure even progress during tensioning. There are four marks on the frame. There is one mark on the sliding block which will align with each of the four on the frame during the tensioning operation.

STUB PINS. For connection of the footwalk bearer to the frame assembly.

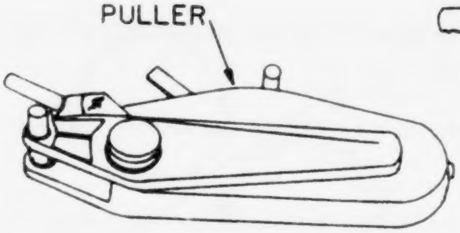
CABLE PULLER (with cable). Used to pull the tensioning post to a near vertical position.

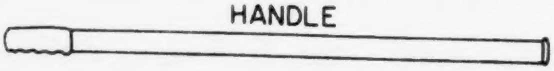
BETA LIGHT. Beta lights are provided for attachment to post tensioning assembly. Purpose of Beta light is to illuminate check marks for construction at night.

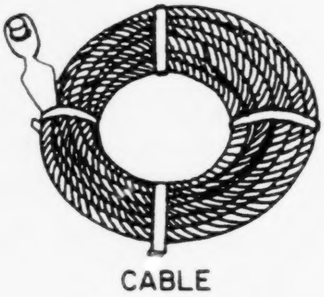

UPPER JAWS
PULLEY
STUB PIN
"BETA" LIGHT
CARRYING BAR BRACKET
TENSIONING POST
CABLE PULLER
LINK CONNECTING BLOCK
STUB PIN

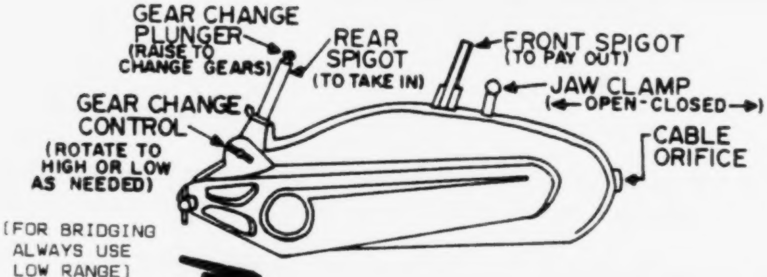
(18) Puller.

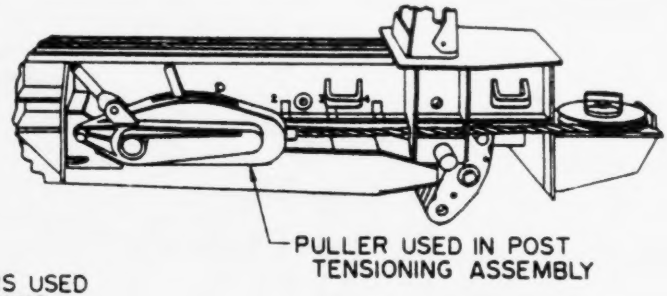
Used with the jacking bracket and davits to raise or lower bridge. It is the same type of puller as the one used on the post tensioning assembly.

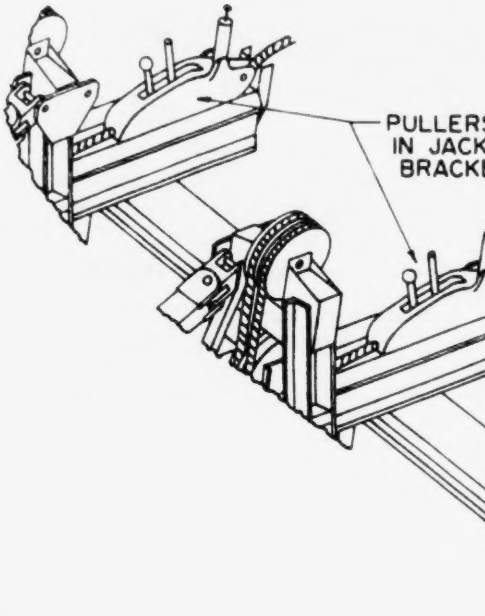







GEAR CHANGE PLUNGER (RAISE TO CHANGE GEARS)
REAR SPIGOT (TO TAKE IN)
FRONT SPIGOT (TO PAY OUT)
JAW CLAMP (←OPEN-CLOSED→)
GEAR CHANGE CONTROL (ROTATE TO HIGH OR LOW AS NEEDED)
CABLE ORIFICE
[FOR BRIDGING ALWAYS USE LOW RANGE]


PULLER USED IN POST TENSIONING ASSEMBLY


PULLERS USED IN JACKING BRACKETS

(19) Rocking Roller.

This roller is used on the bridging capsill to form the capsill roller beam which is required for 16 thru 22 bay DS MGBs with reinforcement.

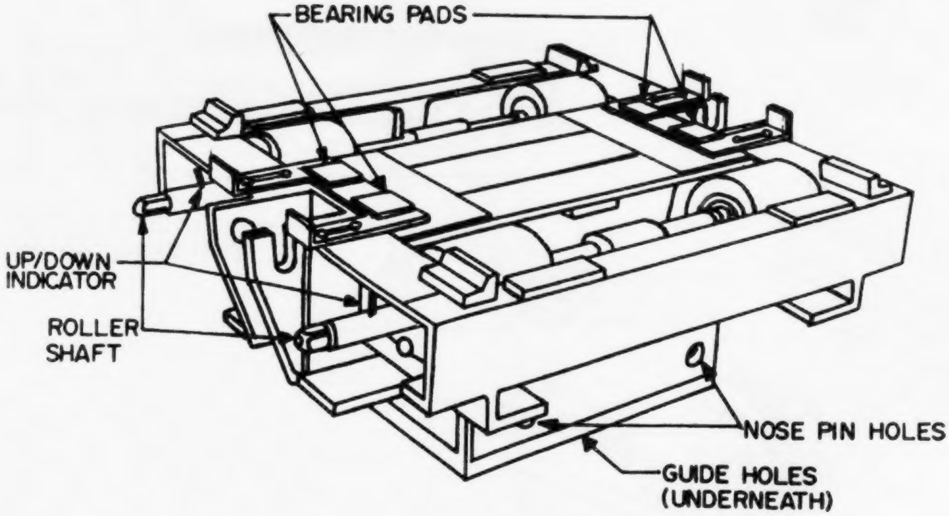
UP/DOWN INDICATOR. Indicates whether roller is up or down.

ROLLER SHAFT. This shaft is square ended to allow fitting the ratchet wrench used to turn the shaft to raise or lower the rollers.

NOSE PIN HOLES. For the nose pins which secure the rollers to the capsill. These nose pins are always secured with retainer clips.

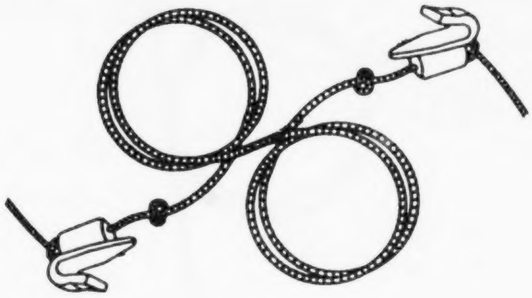
BEARING PADS. Movable plates on the roller frame that the bridge will set on when the rollers are turned to the down position. This is called the locked position of the rollers. To unlock, the rollers are raised, and the plates slid outward.

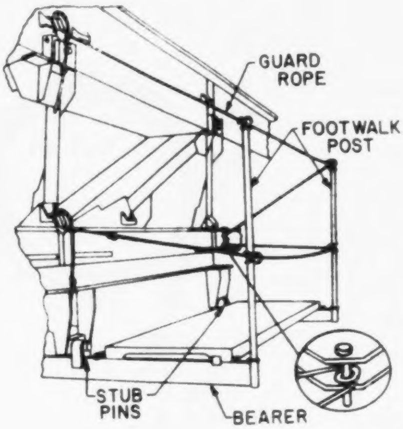
GUIDE HOLES. Used to properly align rocking roller on capsill.



(20) Guard Rope.

Used on footwalk posts to provide a guard rail for safety of the tensioning post work party.





(21) Light Tackle.

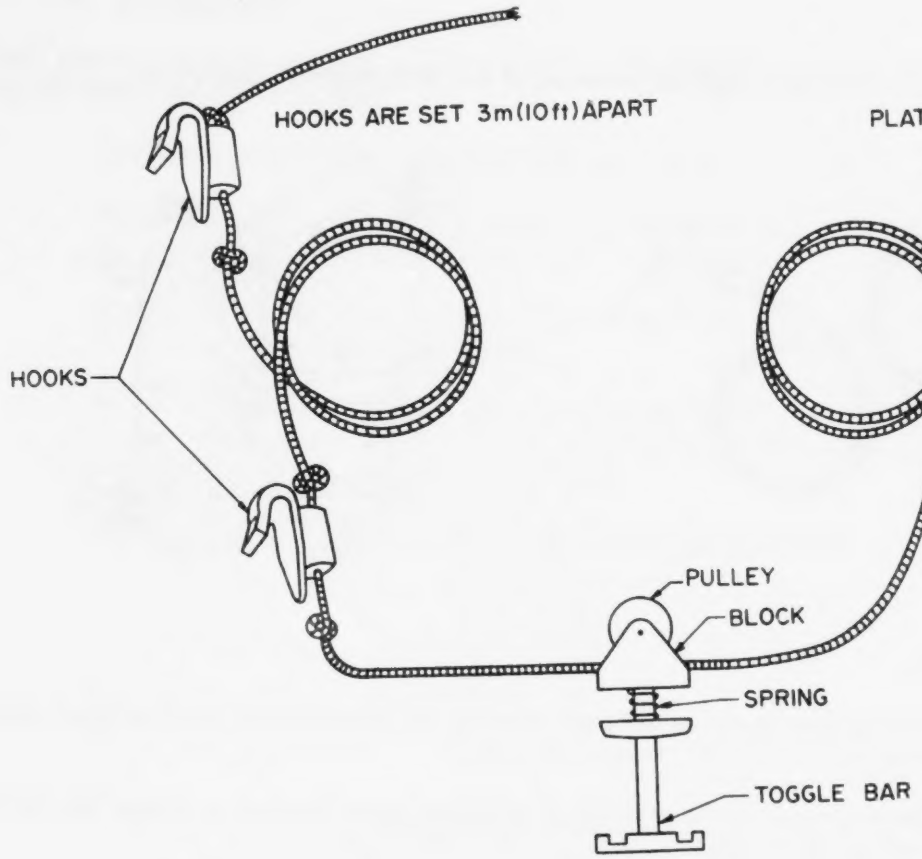
Used to support reinforcing links as a slack link chain under bridge during building and booming. Lowers the link chain to its final position 7 ft. (2.1 m) under each girder.

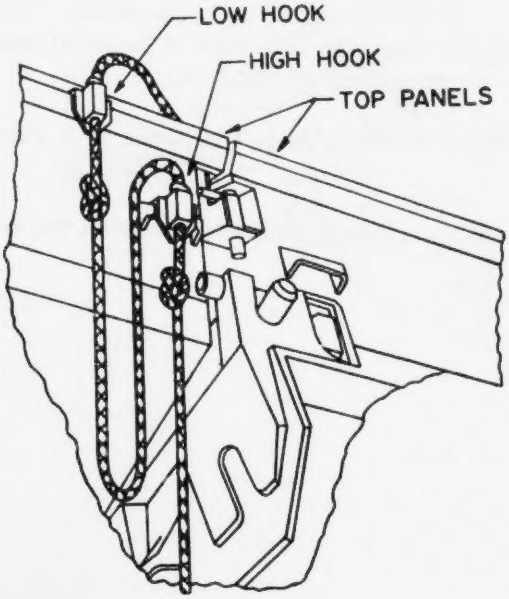
PLATE. Fits on protruding end of panel pin in bottom panel, on inside of bridge. Secured to end of pin with a retainer clip.

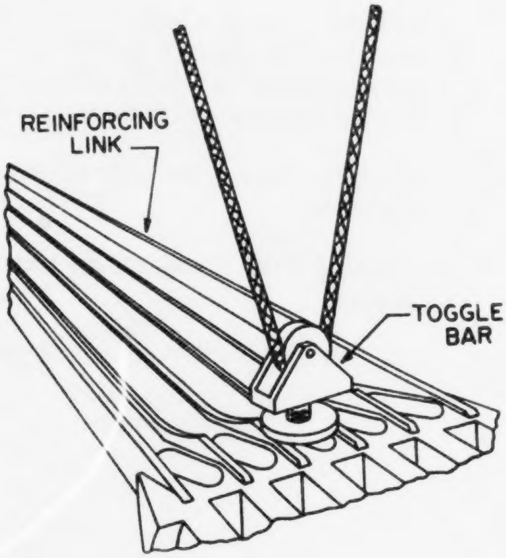
HOOKS. Fits on a carrying bar bracket of top panel, on outside of bridge. The hook closest to the end of the tackle is the LOW position hook. The LOW position hook is connected to the top panel carrying bar bracket after the bridge is jacked down. The other hook is the HIGH position hook. It is connected to the top panel bracket during building and booming.

PULLEY. Allows the rope to ride through it during changing of the hooks to a different position.

TOGGLE BAR. Connects the tackle to the link. It is spring loaded to keep it in the locked position.

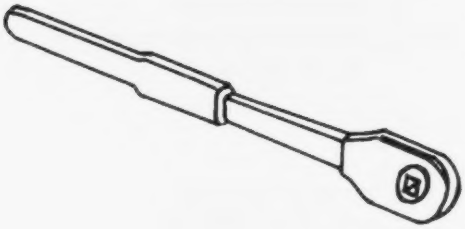

HOOKS ARE SET 3m(10ft)APART
PLATE
HOOKS
PULLEY
BLOCK
SPRING
TOGGLE BAR


LOW HOOK
HIGH HOOK
TOP PANELS


REINFORCING LINK
TOGGLE BAR

(22) Ratchet Wrench 3/4 in.

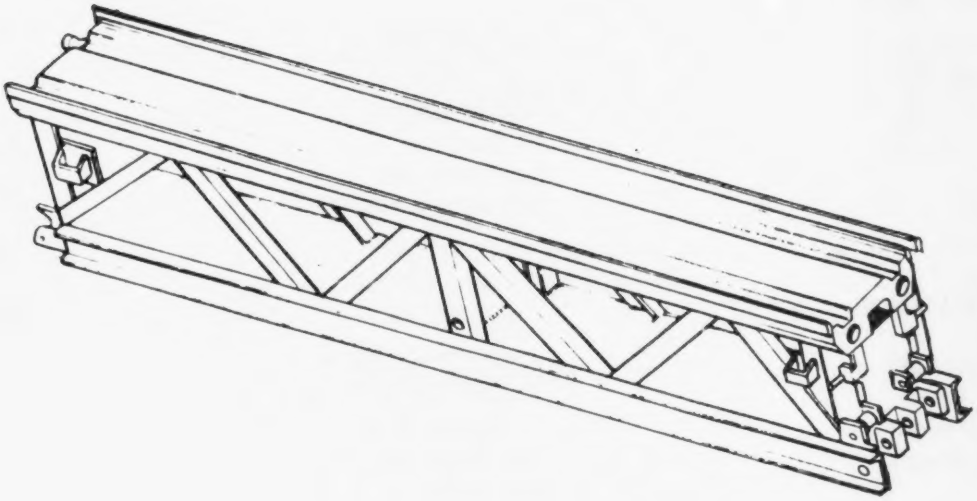
Used to turn roller shafts of rocking roller to raise or lower rollers.



(23) Launching Nose Heavy (LNH).

These nose sections have nonskid top walk. A carrying bar bracket is near each end of the launching nose unit.

They are provided for construction of double story nose required when construcing 18 thru 22 bay double story bridges.



For other components in set, see page 1-36.

b. Weights and Dimensions.

Anchor Assembly (AA)

Length	10 ft 9-1/2 in (3.29 m) transport
Width	2 ft 3-5/8 in (0.70 m)
Height	11-3/16 in (0.2 m)
Weight	362 lbs (164 kg)
	Carried by 4 personnel
	No. in set - 4

Anti-Flutter Tackle (AF)

Length	9 ft 10 in (3.00 m)
Weight	1 lb (0.5 kg)
	No. in set - 5

Push Bar (PB) (Long)

Length	15 ft 8-3/16 in (4.78 m)
Width	4-5/8 in (0.12 m)
Depth	4-1/16 in (0.10 m)
Weight	119 lbs (54 kg)
	Carried by 2 personnel
	No. in set - 2

Footwalk Bearer

Length	5 ft 3/8 in (1.53 m)
Width	2-3/4 in (0.07 m)
Depth	7-3/4 in (0.20 m)
Weight	17 lbs (8 kg)
	No. in set - 10 (including 2 spares)

Jacking Bracket

Length	4 ft 8-1/2 in (1.44 m)
Width	1 ft 2-7/16 in (0.37 m)
Height	1 ft 6 in (0.46 m)
Weight	135 lbs (61 kg)
	No. in set - 2

(b). Weights and Dimensions (Continued)

Bridging Capsill

Length	15 ft 5-7/16 in (4.71 m)
Width	2 ft 6 in (0.76 m)
Height	1 ft 2-5/8 in (0.37 m)
Weight	400 lbs (181 kg) Carried by 6 personnel No. in set - 1

Davit Post Assembly

Length	9 ft 5-7/8 in (2.89 m)
Width	5 ft 5-3/16 in (1.66 m)
Height	11-7/8 in (0.30 m)
Weight	192 lbs (87 kg) Carried by 4 personnel No. in set - 2

Footwalk

Length	5 ft 11-7/8 in (1.83 m)
Width	2 ft 2-7/8 in (0.68 m)
Depth	2-11/16 in. (0.07 m)
Weight	54 lbs (24 kg) No. in set - 4

Hammer

Weight	1.5 lbs (0.7 kg) No in set - 4 (including 2 spares)

Hydraulic Jack (20 ton) Mk2

Height	1 ft 6.5 in (0.46 m) minimum 2 ft 6.5 in (0.76 m) maximum
Weight	47 lbs (21 kg) No. in set - 2 (including 1 spare)

(b). Weights and Dimensions (Continued)

Link launching, Two Tier
(Launching Nose Link)
(LNL)

Length	2 ft 7 in (0.79 m)
Width	6 in (0.15 m)
Weight	11 lbs (5 kg)
	No. in set - 3 (including 1 spare)

Long Reinforcing Link

Length	12 ft 3-1/2 in (3.75 m)
Width	1 ft 2-1/16 in (0.36 m)
Depth	3-15/16 in (0.10 m)
Weight	125 lbs (57 kg)
	Carried by 2 personnel No. in set - 20 (including 2 spares)

Short Reinforcing Link

Length	6 ft 3-1/2 in (1.92 m)
Width	1 ft 2-1/16 in (0.36 m)
Depth	3-15/16 in (0.10 m)
Weight	77.5 lbs (35 kg)

Landing Roller Pedestal
(LRP) Mk2

Length	5 ft 6 in (1.7 m)
Width	2 ft 6-1/2 in (0.78 m)
Height	1 ft 1-11/16 in (0.35 m)
Weight	218 lbs (99 kg)
	Carried by 1 personnel No. in set - 4 (including 2 spare)

Anchorage Pin Assembly

Length	2 ft 9-7/8 in (0.86 m)
Diameter	1-3/4 in (0.04 m)
Weight	26 lbs (12 kg)
	No. in set - 10 (including 2 spares)

(b). Weights and Dimensions (Continued)

Capsill Pin

Length	1 ft 8.5 in (0.52 m)
Diameter	1.5 in (38 mm)
Weight	10 lbs (4.5 kg)
	No. in set - 3
	(including 1 spare)

Footwalk Post

Length	4 ft 3/8 in (1.23 m)
Width	3-13/16 in (0.10 m)
Depth	2-15/16 in (0.08 m)
Weight	2.6 lbs (1.2 kg)

Post Tensioning Assembly (PT)

Length	9 ft 4-1/16 in (2.85 m)
Width	2 ft 3-3/4 in (0.71 m)
Height	2 ft 10-1/16 in (0.87)
Weight	657 lbs (298 kg)
	Carried by 1 personnel
	No. in set - 8

Puller

Length	22-1/2 in (0.57 m)
Weight	33 lbs (15 kg)
	No. in set - 2
	Carried by 6 personnel
	No. in set - 4

Rocking Roller

Length	2 ft 1-9/16 in (0.65 m)
Width	2 ft 11-7/16 in (0.90 m)
Height	1 ft 1-11/16 in (0.35 m)
Weight	235 lbs (107 kg)
	Carried by 4 personnel
	No. in set - 2

(b). Weights and Dimensions (Continued)

Guard Rope

Length	30 ft (9.14 m)
Weight	2 lbs (0.9 kg)
	No. in set - 4

Light Tackle (LT)

Length	25 ft (7.62 m)
Weight	2 lbs (0.9 kg)
	No. in set - 20 (including 2 spares)

Ratchet Wrench 3/4 in

Length	1 ft 10-1/2 in (0.57 m)
Weight	5 lbs (2 kg)
	No. in set - 2

Other Components

"The components listed are issued with the LRS, but are not illustrated as they are components also issued in other MGB sets"

1. Adapter pallet to trailer	1 ea
2. Bag, equipment	2 ea
3. Basket, equipment	4 ea
4. Clip, retainer	150 ea
5. Pallet assy, Truck Mounted*	1 ea
6. Pallet Assy, Truck Mounted*	1 ea
7. Pin, Bracing	22 ea
8. Pin, launching nose	40 ea
9. Seat, building frame jack	2 ea

*These components issued complete with all accessories (Strap, bumpers and lugs).

Chapter 2
OPERATING INSTRUCTIONS

Section I. Preparation for Operation/Installation

	Paragraph	Page
General	2-1	2-1
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Reconnaissance Report	2-4	2-6
Choice of Bridge Length and Class	2-5	2-6
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2-1. GENERAL

This chapter provides the information needed to select the best site for the bridge, determine the length and class of the bridge, perform bridge design, and assemble/disassemble link reinforced bridges.

2-2. PRELIMINARY STUDIES

A thorough evaluation of information from preliminary studies may aid the reconnaissance by limiting it to a few suitable sites. Sources of preliminary information are intelligence studies and reports, interviews with local civilians, maps, aerial photographs, and personal aerial reconnaissance.

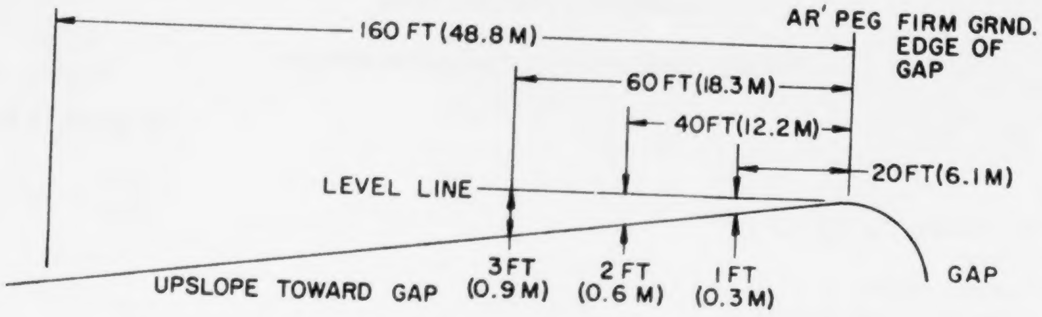
2-3. SITE SELECTION

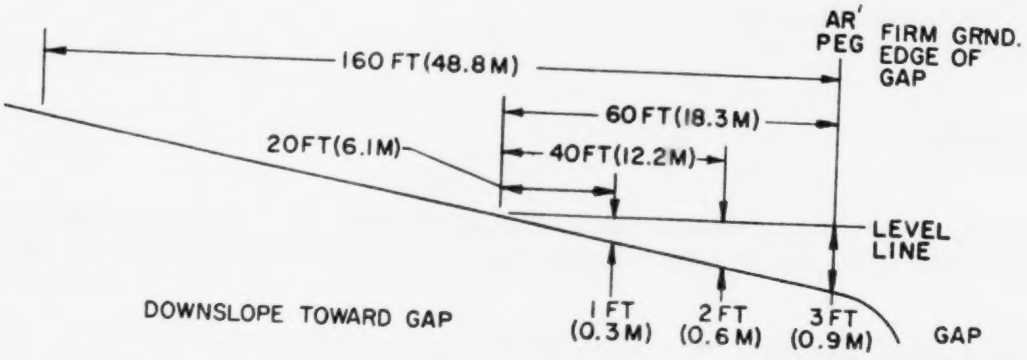
Whenever possible a ground reconnaissance is made to find a site that has selection factors desirable for construction of link reinforced MGBs. Following are the factors that must be considered during the reconnaissance:

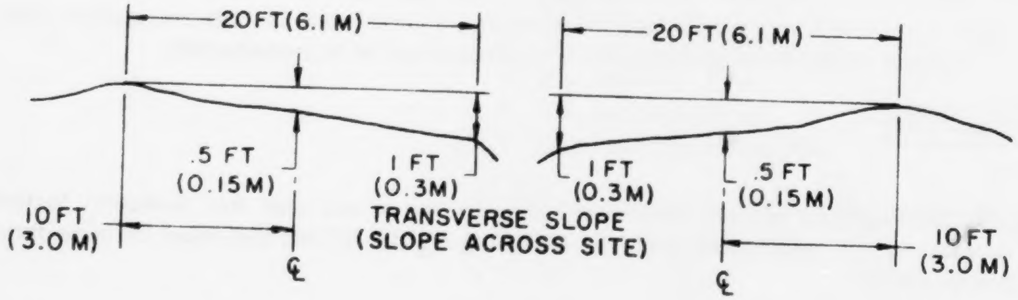
a. Access routes at each end of the bridge that tie in to the main road net. These routes should not require too much maintenance or preparation.

b. Approaches requiring little preparation. Should be two lanes wide and straight for 160 ft (48.8 m) at each end of the bridge. Slope of the approach should not exceed 1 in 20. Transverse (side to side) slope should not exceed 1 in 20 in the first 60 ft (18.3 m) measured from the AR peg.

2-3. SITE SELECTION — Continued


160 FT (48.8 M)
AR' PEG
FIRM GRND.
EDGE OF
GAP
60 FT (18.3 M)
40 FT (12.2 M)
20 FT (6.1 M)
LEVEL LINE
3 FT
(0.9 M)
2 FT
(0.6 M)
1 FT
(0.3 M)
GAP
UPSLOPE TOWARD GAP


AR'
PEG
160 FT (48.8 M)
FIRM GRND.
EDGE OF
GAP
60 FT (18.3 M)
20 FT (6.1 M)
40 FT (12.2 M)
LEVEL
LINE
DOWNSLOPE TOWARD GAP
1 FT
(0.3 M)
2 FT
(0.6 M)
3 FT
(0.9 M)
GAP


20 FT (6.1 M)
20 FT (6.1 M)
.5 FT
(0.15 M)
1 FT
(0.3 M)
1 FT
(0.3 M)
.5 FT
(0.15 M)
10 FT
(3.0 M)
TRANSVERSE SLOPE
(SLOPE ACROSS SITE)
℄
℄
10 FT
(3.0 M)

c. Firm and stable banks of about equal height. The difference in bank height can not exceed 5 percent of the gap width, as the bridge is restricted to a 1 in 20 slope.

(1) Table 2-1 gives maximum height difference for maximum gap widths of bridges that can be built.

2-3. SITE SELECTION — Continued

Table 2-1. Bank Height Difference

Maximum Gap Width		Bridge Length 2E + No. of Bays	Maximum Bank Height Difference*	
ft	m		ft	m
103	31.4	13	5.08	1.54
109	33.2	14	5.38	1.64
113**	34.4**	15	5.68	1.73
121	36.9	16	5.98	1.82
127	38.8	17	6.28	1.91
133	40.5	18	6.58	2.0
139	42.5	19	6.88	2.1
145	44.2	20	7.18	2.19
148.75	45.3	21	7.44	2.27
152.5	46.5	22	7.63	2.33

** = Due to launching nose length and configuration.
* = These height differences are measured at AR Pegs.

(2) Banks at expected bearing points of bridge should have a Soil Bearing Capacity (SBC) of 2 tons per square foot. Table 2-2 lists SBC of various types of soil.

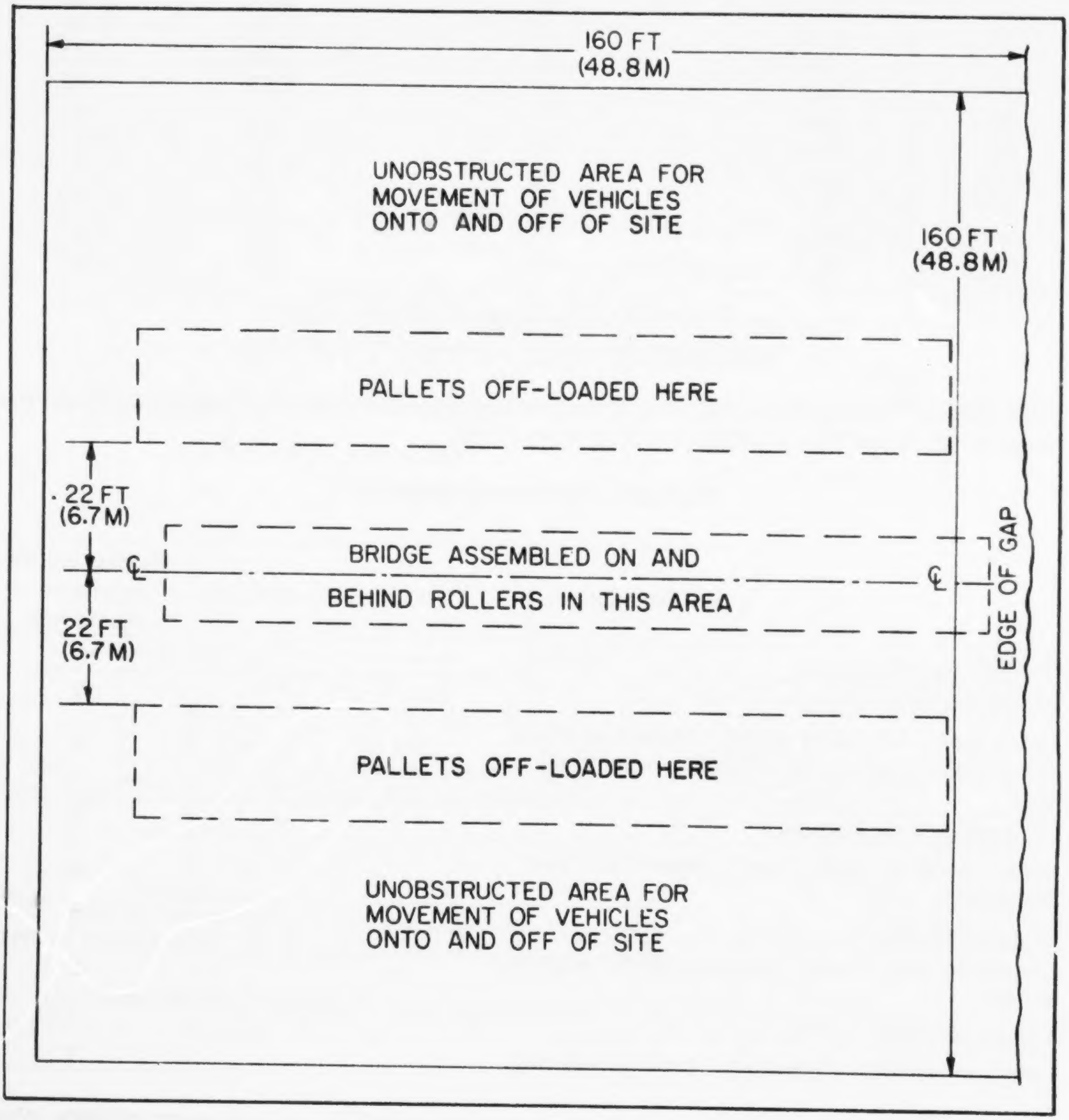
Table 2-2. Soil Bearing Capacity

Soil Description	Bearing values in tons per square foot
Hardpan overlaying rock	12
Very compact sand gravel	10
Loose gravel and sandy gravel, compact sand and gravelly sand; very compact sand-in-organic silt soils	6
Hard dry consolidated clay	5
Loose coarse to medium sand, medium compact fine sand	4
Compact sand clay	3
Loose fine sand, medium compact sand-in-organic silt soil	2
Firm or stiff clay	1.5*
Loose saturated sand-clay soils, medium soft clay	1*

*Bridges constructed on this type of soil will require packing under ETP to spread weight of bridge. Watch settling during crossing of traffic, and increase packing if needed. Packing lumber (3 in x 8 in x 36 in) is placed under bridge to cover a 3 ft (0.9 m) area under each ETP. Height of packing will be minimum necessary to keep ETPs from touching bank.

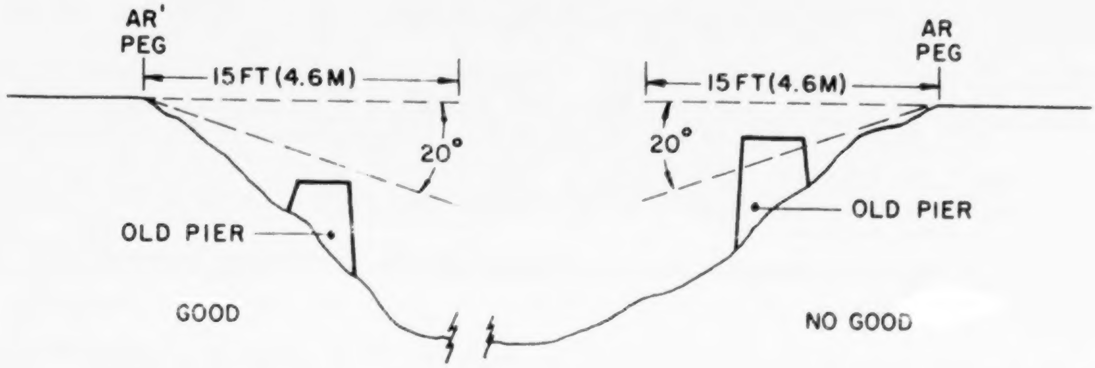
2-3. SITE SELECTION — Continued

d. Assembly site large enough for assembly of the bridge and wide enough for unloading and positioning of the loaded bridge pallets. The size of the assembly site required for the longest double story bridge is 160 ft wide x 160 ft long (48.8 m x 48.8 m). This length includes the R distance, and trucks with push bar attached. The width allows for ample construction space and good spacing of pallets from centerline. If needed, this area can be reduced considerably by bringing in pallet loads one at a time or as needed. The desired size of a site is shown.


160 FT
(48.8M)
UNOBSTRUCTED AREA FOR
MOVEMENT OF VEHICLES
ONTO AND OFF OF SITE
160 FT
(48.8M)
PALLETS OFF-LOADED HERE
22 FT
(6.7M)
℄
BRIDGE ASSEMBLED ON AND
BEHIND ROLLERS IN THIS AREA
℄
EDGE OF GAP
22 FT
(6.7M)
PALLETS OFF-LOADED HERE
UNOBSTRUCTED AREA FOR
MOVEMENT OF VEHICLES
ONTO AND OFF OF SITE

2-3. SITE SELECTION — Continued

e. The bank heights above flowing water or obstructions in the gap should be a minimum of 12.0 ft (3.7 m). In addition, there must be no obstacle intruding above a plane inclined 20° downward in the gap for a distance of 15 ft (4.6 m) from each AR Peg as shown below.



If the bank height is less than 12.0 ft (3.7 m) the rules in (1) and (2) below apply.

(1) For bridges 2E + 14 bays and below there is no limit on bank height as long as the current does not exceed 5 fps (1.5 m/s) in which the reinforcing links can be immersed during launching and before tensioning.

(2) For bridges 2E + 15 bays and above there is no limit on bank height as long as the current does not exceed either:

(a) 3.5 fps (1.0 m/s) in which case the reinforcement can be immersed only during launching and before tensioning.

(b) The current speed allowed as a vehicle crosses that particular bridge length is shown in Table 2-3.

Table 2-3. Maximum Current Velocity vs. Bridge Length

2E + No. of Bays		22	21	20	19	18	17	16	15	14	13
Bridge Length	ft	163	157	151	145	139	133	127	121	115	109
	m	49.7	47.9	46.0	44.2	42.4	40.5	38.7	36.9	35.1	33.2
Current on Immersed Links	fps	1.64	1.64	3.08	3.67	3.93	4.29	6.95	7.67	8.43	8.43
	m/s	0.5	0.5	0.94	1.12	1.2	1.31	2.12	2.34	2.57	2.57

f. The wind speed permitted for each bridge length is given below. The bridge will require lateral anchorage before crossing vehicles when wind speed exceeds those given.

2-3. SITE SELECTION — Continued

Table 2-4. Maximum Wind Speed vs. Bridge Length

2E + No. of Bays		22	21	20	19	18	17	16	15	14	13
Bridge Length	ft	163	157	151	145	139	133	127	121	115	109
	m	49.7	47.9	46.0	44.2	42.4	40.5	38.7	36.9	35.1	33.2
Wind Speed	mph	50	50	95	120	120	120	120	120	120	120
	km/mph	80.5	80.5	152.9	193.1	193.1	193.1	193.1	193.1	193.1	193.1

g. An area large enough to allow the trucks and bolster trailers to completely turn around so that they can back into the site.

h. Vehicle park: A covered and concealed area, located from .3 to 3.1 miles (.5 to 5 kms) behind the bridge site, in which the trucks and trailers can be parked after off loading.

2-4. RECONNAISSANCE REPORT

a. Before any attempt is made to begin installation of a link reinforced MGB, the unit that will construct the bridge should be furnished a reconnaissance report. This report must contain the following information as a minimum. Minimum information will be used to determine length and type of bridge.

(1) Location of the site—map coordinates or specific directions from the base camp to the site.

(2) Width of gap (AR Gap) on bridge centerline. The unit must know the AR Gap in order to plan the mission, as the military load class (MLC) and the AR Gap will be applied to tables to determine the length and type of bridge needed.

b. If only the minimum information is provided, bridge unit personnel will have to conduct a reconnaissance to obtain elevations, site conditions and other design related information.

2-5. CHOICE OF BRIDGE LENGTH AND CLASS

a. Bridge Length. Use the AR Gap from the reconnaissance report to find the length of the bridge in Table 2-5.

b. Bridge Class. All link reinforced bridges have a MLC capacity of class 60.

2-6. BRIDGE CONSTRUCTION TIMES

a. Building times for various bridge lengths is given in Chapter 1. These times are figured from the arrival on site to the opening of the bridge for traffic.

2-6. BRIDGE CONSTRUCTION TIMES — Continued

b. The time for construction can be decreased through drill training and thorough planning of the mission.

c. Poor site conditions and inclement weather will increase the amount of building time.

d. Increasing or decreasing the size of the work party will considerably increase building times. The number of personnel required for the different bridge lengths is the number necessary to assemble/disassemble the bridge in the most efficient manner.

Table 2-5. Bridge Length vs AR Gap Ranges

AR Gap Ranges Minimum		AR Gap Ranges Maximum		Bridge Length 2E + No. of			Nose Construction No. of LNH	R Distance	
ft	m	ft	m	Bays	ft	m		ft	m
94	28.7	103	31.4	13	109	33.2	7N1	91	27.7
100	30.1	109	33.3	14	115	35.1	7N1	95	29.0
106	32.3	113***	34.4***	15	121	36.9	7N1	95	29.0
112	34.1	121	36.9	16*	127	38.7	8N1	97	30.0
118	36.0	127	38.7	17*	133	40.5	8N1	97	30.0
124	37.8	133	40.6	18*	139	42.4	6N1 + 3N2	97	30.0
*130	39.6	139	42.4	19**	145	44.2	6N1 + 3N2	115	35.1
136	41.5	145	44.2	20**	151	46.0	6N1 + 3N2	127	38.7
142	43.3	150	45.6	21**	157	47.9	6N1 + 3N2	127	38.7
148	45.1	152.5	46.5	22**	163	49.7	6N1 + 3N2	133	40.5

NOTE * = Used for example below.
** = CRB must be used instead of LRB.
*** = Due to launching nose length and configuration.

The AR Gap Ranges have been computed for each bridge length taking into account the minimum and maximum bearing for all link reinforced MGB's.

EXAMPLE:

Reconnaissance report gives an AR Gap of 133 ft (40.5 m). Read down the AR Gap columns until a range of gaps is found that will bracket the AR Gap given.

*In this case, 130 ft (39.6 m) to 139 ft (42.4 m) will bracket 133 ft (40.5 m).

Reading across this line it is found that a 2E + 19 bay – 145 ft (44.2 m) long bridge will be needed to span given AR Gap.

The 2E + 19 bay will require a 6N1 + 3N2 launching nose, and an R distance (contruction space) of 115 ft (35.1 m) and will require the use of a CRB.

2-7. WORK PARTY REQUIRED

The link reinforcement work party consists of 8 persons. The 8 persons are divided into left and right side crews of 4 persons each. Each crew is responsible for installation of the components on their side of the bridge. At various times during construction, it will be necessary to combine crews to perform some tasks.

The standard work party of 1 NCO (supervisor) and 24 persons will construct the bridge.

2-8. QUANTITY OF COMPONENTS REQUIRED

Table 2-6 gives the quantities of components required for the various lengths of bridges. To construct link reinforced bridges, it is necessary to combine two bridge sets, one erection set, and one link reinforcement set.

Table 2-6. Components Per Bridge Length

Bridge Length 2E + No. of Bays	13	14	15	16	17	18	19	20	21	22
Nose Construction Component	7N1	7N1	7N1	8N1	8N1	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2
Adapter, Push Bar	1	1	1	1	1	1	1	1	1	1
Anchor Piece Assy	4	4	4	4	4	4	4	4	4	4
Anti-Flutter Tackle	4	4	4	4	4	4	4	4	4	4
Bag, Equipment	4	4	4	4	4	4	4	4	4	4
Bar Assy, Launch (long)*	2	2	2	2	2	2	2	2	2	2
Bar Assy, Launch (short)*	2	2	2	2	2	2	2	2	2	2
Bar, Carrying	32	32	32	32	32	32	32	32	32	32
Basket, Equipment	21	21	22	23	23	24	24	25	25	26
Beam Assy, Roller	3	3	3	3	3	2	2	2	2	2
Beam, Bankseat	2	2	2	2	2	2	2	2	2	2
Bearer, Footwalk	8	8	8	8	8	8	8	8	8	8
Brace, Sway	17	18	19	20	21	22	23	24	25	26
Bracket Assy, Lifting**	2	2	2	2	2	2	2	2	2	2
Bracket, Jacking**	2	2	2	2	2	2	2	2	2	2
Cable, Extractor	1	1	1	1	1	1	1	1	1	1
Capsill, Bridging	—	—	—	1	1	1	1	1	1	1
Clip, Retainer	131	135	141	146	152	165	171	175	181	183
Curb	34	36	38	40	42	44	46	48	50	52
Davit Assy, Post**	2	2	2	2	2	2	2	2	2	2
Deck	72	76	80	84	88	92	96	100	104	108

2-8. QUANTITY OF COMPONENTS REQUIRED — Continued.

Table 2-6. Components Per Bridge Length

Bridge Length 2E + No. of Bays	13	14	15	16	17	18	19	20	21	22
Nose Construction Component	7N1	7N1	7N1	8N1	8N1	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2
Footwalk, Bridge	4	4	4	4	4	4	4	4	4	4
Girder, Cross Frame	3	3	3	3	3	3	3	3	3	3
Girder, Launching Nose	1	1	1	1	1	1	1	1	1	1
Girder, Push Bar	1	1	1	1	1	1	1	1	1	1
Guide Marker	24	24	26	26	28	28	30	30	32	32
Hammer, Hand	2	2	2	2	2	2	2	2	2	2
Handle, Carrying	32	32	32	32	32	32	32	32	32	32
Jack, Bridge, 15 ton	6	6	6	6	6	6	6	6	6	6
Jack, Bridge, 20 ton	1	1	1	1	1	1	1	1	1	1
Link, Launching Nose	—	—	—	—	—	2	2	2	2	2
Link, Reinforcing, Long	8	10	10	12	12	14	14	16	16	18
Link, Reinforcing, Short	2	—	2	—	2	—	2	—	2	—
Nose, Heavy, Launching	7	7	7	8	8	12	12	12	12	12
Nose, Light, Front	1	1	1	1	1	1	1	1	1	1
Nose, Light, Rear	1	1	1	1	1	1	1	1	1	1
Pallet, Trk Mtd	6	6	6	6	6	6	7	7	7	7
Pallet, Trlr Mtd	5	5	5	6	6	6	6	6	6	7
Panel, Bottom	26	28	30	32	34	36	38	40	42	44
Panel, End Taper	4	4	4	4	4	4	4	4	4	4
Panel, Erection Aid	2	2	2	2	2	2	2	2	2	2
Panel, Junction	4	4	4	4	4	4	4	4	4	4
Panel, Top	34	36	38	40	42	44	46	48	50	52
Pedestal Assy, Adj Mk 2***	2	2	2	2	2	2	2	2	2	2
Pin, Anchorage	8	8	8	8	8	8	8	8	8	8
Pin, Bracing	54	56	58	60	62	64	66	68	70	72
Pin, Capsill	2	2	2	2	2	2	2	2	2	2
Pin, Launching Nose	30	30	32	33	35	38	40	40	42	42
Pin, Panel	79	83	87	91	95	99	103	107	111	115
Pin, Panel, Headless	4	4	4	4	4	5	5	5	5	5
Plate, Base, DS	6	6	6	6	6	6	6	6	6	6
Post Assy, Jack**	2	2	2	2	2	2	2	2	2	2
Post, Launching Nose	2	2	2	2	2	2	2	2	2	2
Post Tensioning Assy	4	4	4	4	4	4	4	4	4	4
Post Footwalks	8	8	8	8	8	8	8	8	8	8
Pullers	6	6	6	6	6	6	6	6	6	6

2-8. QUANTITY OF COMPONENTS REQUIRED — Continued

Table 2-6. Components Per Bridge Length — (Continued)

Bridge Length 2E + No. of Bays	13	14	15	16	17	18	19	20	21	22
Nose Construction Component	7N1	7N1	7N1	8N1	8N1	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2
Puller, Cable**	2	2	2	2	2	2	2	2	2	2
Ramp, Long	14	14	14	14	14	14	14	14	14	14
Roller, Landing	2	2	2	2	2	2	2	2	2	2
Roller, Launching Nose	1	1	1	1	1	1	1	1	1	1
Roller, Rocking	—	—	—	2	2	2	2	2	2	2
Rope, Guard	4	4	4	4	4	4	4	4	4	4
Seat, Building Frame	6	6	6	6	6	6	6	6	6	6
Support Assy, Adj	6	6	6	6	6	6	6	6	6	6
Support, Jack**	2	2	2	2	2	2	2	2	2	2
Sling, Steel, Wire Rope	1	1	1	1	1	1	1	1	1	1
Tackle, Light	8	8	10	10	12	12	14	14	16	16
Wrench, Ratchet	2	2	2	2	2	2	2	2	2	2

* = In an emergency minimum of 1 long push bar required for launch. Short push bar can be used with davits.

** = Method of raising/lowering will determine quantity of these items.

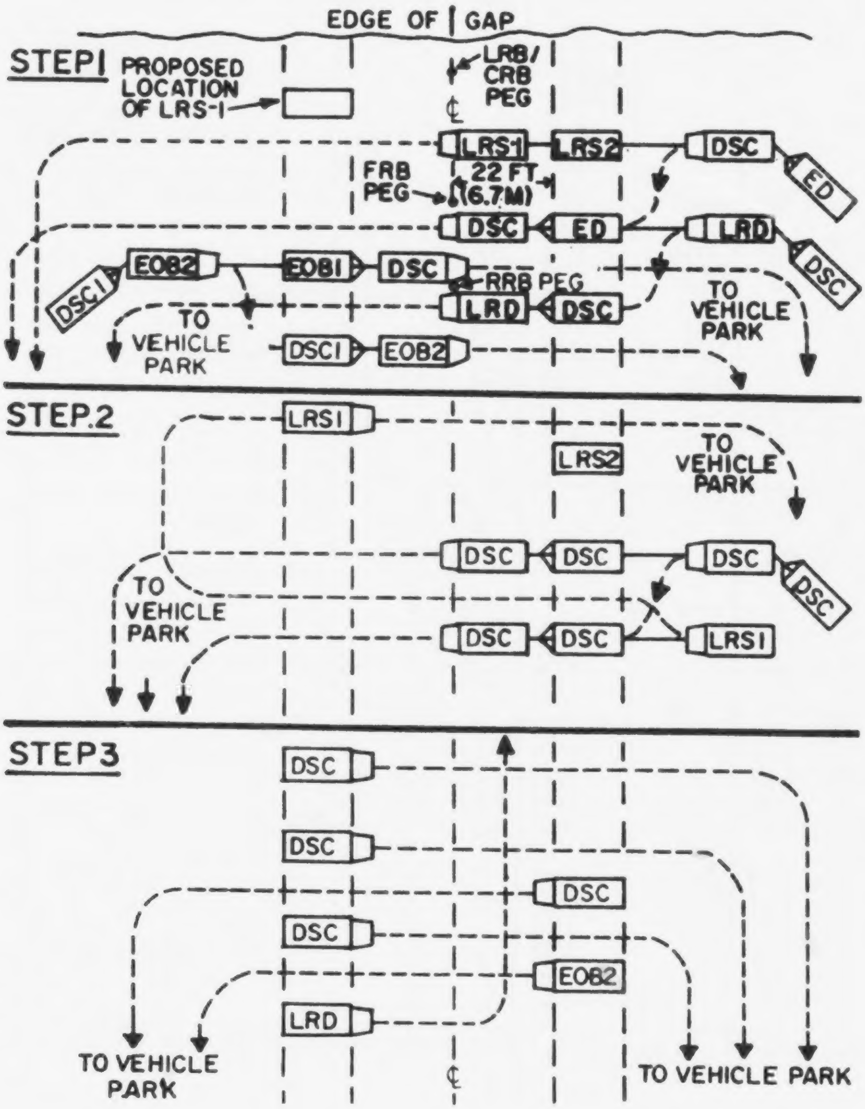
*** = Quantity of 2 required to make re-positioning of LRP under nose easier. LRP can be repositioned with one launching nose heavy section used in place of second LPR.

2.9. BRIDGING PHASE OPERATIONS

a. In the organization of the MGB mission there are five phases of the bridging operation. The purpose of this paragraph is to list and briefly describe the phases.

(1) Pallet Off-loading. After the marking of the site has been completed, the pallets are removed from trucks and trailers. Pallets may be pulled off of trucks and trailers with the aid of an extractor cable, or trucks may dump pallets by elevating the bed.

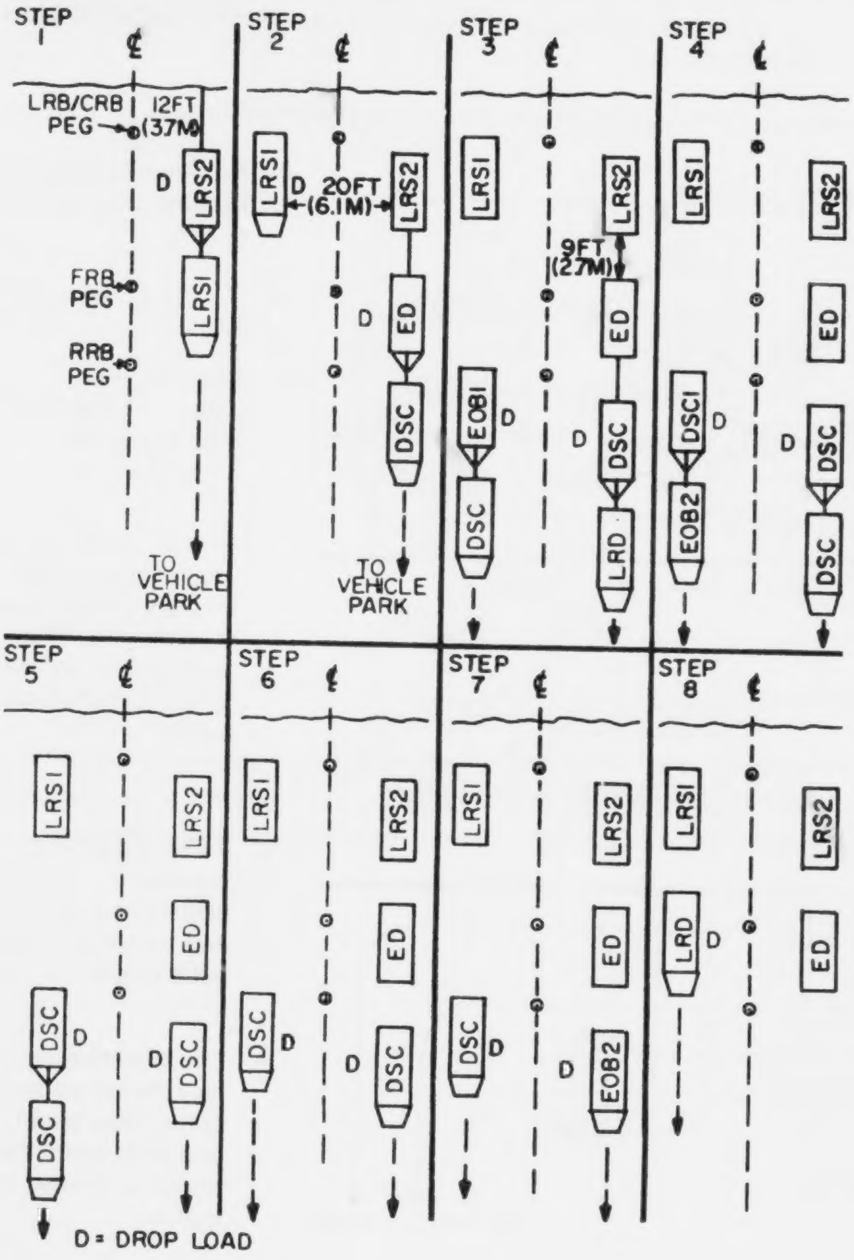
(a) Normal Site. An example of off-loading on a normal site is shown below.


EDGE OF GAP
STEP1
PROPOSED LOCATION OF LRS-1
LRB/CRB PEG
℄
LRS1
LRS2
DSC
ED
FRB PEG
22 FT (6.7M)
DSC
ED
LRD
DSC
EOB2
EOB1
DSC
RRB PEG
DSC1
LRD
DSC
TO VEHICLE PARK
TO VEHICLE PARK
DSC1
EOB2
TO VEHICLE PARK
STEP.2
LRS1
LRS2
TO VEHICLE PARK
DSC
DSC
DSC
DSC
TO VEHICLE PARK
DSC
DSC
LRS1
STEP3
DSC
DSC
DSC
DSC
EOB2
LRD
TO VEHICLE PARK
℄
TO VEHICLE PARK

1. Minimum distance between pallets is 5 ft (1.5 m).
2. Front edge of pallet—22 ft (6.7 m) from centerline.
3. LRD pallet remains on truck until bridge is on ground. This truck should be used to boom and launch bridge.
4. Pallet unpacking consists of unstrapping pallets and carrying bridge parts to site.
5. The assembly begins with the construction of the roller beam and ends when the bridge is opened for traffic.

2-9. BRIDGING PHASE OPERATIONS — Continued

(b) Restricted Site. An example of off-loading on a restricted site is shown below.


STEP 1
STEP 2
STEP 3
STEP 4
STEP 5
STEP 6
STEP 7
STEP 8
℄
LRB/CRB PEG
12FT (3.7M)
FRB PEG
RRB PEG
20FT (6.1M)
9FT (2.7M)
LRS1
LRS2
ED
DSC
DSC1
EOB1
EOB2
LRD
D
TO VEHICLE PARK
D = DROP LOAD

1. Pallets are removed from site after parts are removed.

2. Picket holdfast or other pallets are used as anchorage to remove pallets from trailers.

3. Extractor cable will have to be doubled back on itself to shorten it.

4. Disassembly of the bridge begins with the removal of the guide markers.

Section II. DESIGN

2-10. Length and Type Bridge.

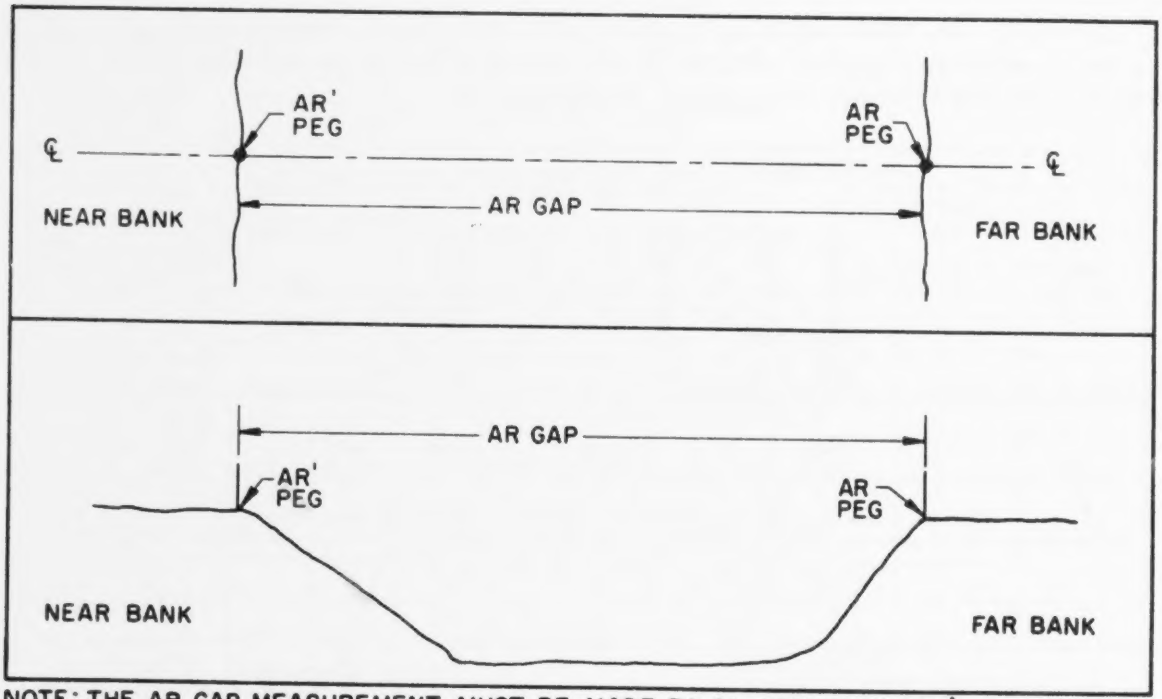
MGB design is a two phase operation to determine the length of the bridge, type of construction and correct settings of roller beams and the launching nose cross girder.

Phase 1. In this phase, the preliminary studies, site selection and reconnaissance are performed to determine the length of bridge, type of construction, location and elevation's of the key construction points on the site.

Phase 2. In this phase, the information obtained in phase 1 is used to determine the height setting of the roller beams and the position of the launching nose cross girder.

The procedures that follow are design related parts of the two phases.

a. Measure AR Gap. See Diagram below. Select bridge center line. Place a peg on the centerline at the edge of firm ground on the far bank. Place a peg on the near bank at the edge of firm ground on the centerline. Measure the distance between the pegs. This distance is the AR Gap. Ensure that soil bearing capacity meets requirement as found in paragraph 2-3. c.(2).



NOTE: THE AR GAP MEASUREMENT MUST BE MADE TO AN ACCURACY OF ± 4 IN. (0.1 M).

b. Select Bridge. Select a bridge of the required military load class (MLC) using procedures in paragraph 2-5. a. and b. Note that for each bridge length there is a range of AR gaps: e.g., 133 ft (40.5 m) bridge - AR gap range is 118 - 125 ft (36.0 - 38.3 m). This range has been computed for each bridge length taking into account the minimum and maximum bearing for all bridges.

EXAMPLE:

(1) Given an AR gap 99 ft (299.9 m), mission requires MLC 60. Select bridge:

See paragraph 2-5. a.

Select DS 13 bay - 109 ft (33.2 m) bridge.

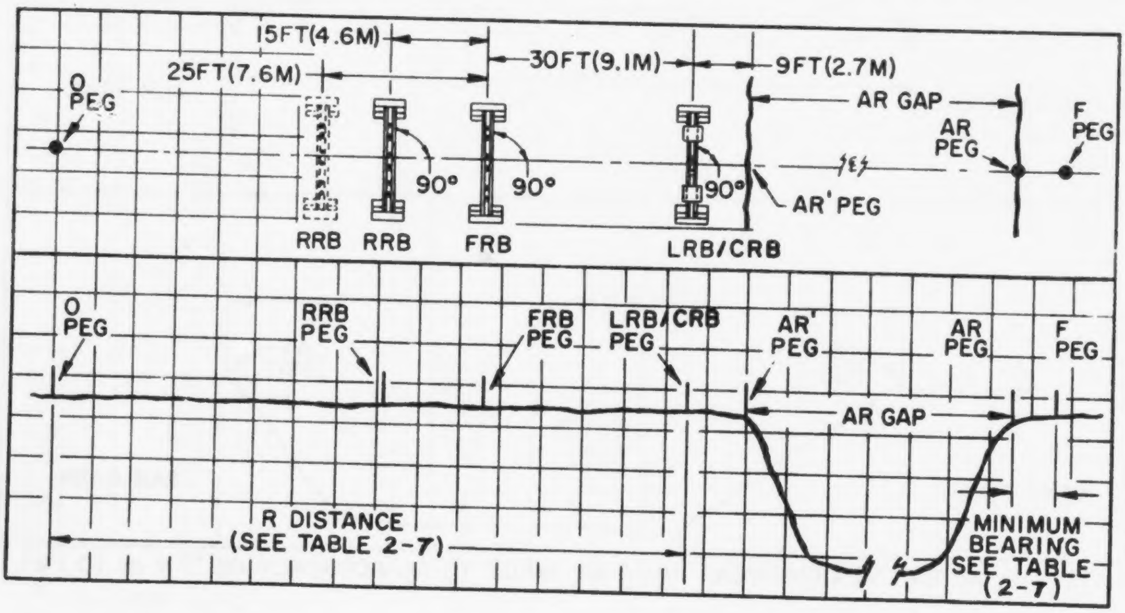
(2) Given an AR gap 125 ft (37.9 m), mission requires MLC 60. Select bridge:

See paragraph 2-5. a.

Select either DS 17 bay - 133 ft (40.5 m) or DS 18 bay - 139 ft (42.4 m) bridge.

Answer: Select easiest bridge to build - shortest bridge. Select DS 17 bay - 133 ft (40.5 m).

c. Locate and Take Elevations at Key Construction Points. These points are shown and explained below. When taking elevations the LRB/CRB peg is to be used as Datum (0.0 elevation) and the elevation of the other pegs are to be given in relation to the LRB/CRB peg.


15FT(4.6M)
25FT(7.6M)
30FT(9.1M)
9FT(2.7M)
O PEG
90°
90°
90°
AR GAP
AR PEG
F PEG
AR' PEG
RRB
RRB
FRB
LRB/CRB
O PEG
RRB PEG
FRB PEG
LRB/CRB PEG
AR' PEG
AR PEG
F PEG
AR GAP
R DISTANCE (SEE TABLE 2-7)
MINIMUM BEARING SEE TABLE (2-7)

(1) Locate Key Construction Points.

(a) F. peg. Final position of far bank end of bridge. For design purposes, the F peg is located distance given in Table 2-7.

(b) LRB/CRB peg. Location of launching roller beam. Distance from AR' peg to center of LRB/CRB is always 9 ft (2.7 m).

(c) RRB peg. Location of rear roller beam. Distance from center of LRB/CRB to center of RRB is always 45 ft (13.7 m).

(d) O peg. Point indicating the end of R distance. See Table 2-7 for R distance needed for bridge being constructed.

(2) Locate other points on site.

(a) FRB peg. Location of front roller beam. Distance from center of LRB/CRB to center of FRB is always 30 ft (9.1 m).

(b) F' peg. Final position of near bank end of bridge (near bank bearing). This distance is found by adding the distance form the AR peg to the F peg (far bank bearing) Paragraph 2-10. a, to the length of the AR gap. The total of these two is then subtracted from the bridge length, the result being the distance from the AR' peg to where the F' peg is placed. This bearing distance must not be less than distance given in Table 2-7.

EXAMPLE: Finding AR' to F' distance (near bank bearing).

GIVEN: AR gap - 115 ft (34.8 m) and bridge length - 127 ft (38.7 m)

Near bank bearing = Brg length - (AR gap + far bank bearing)
= 127 ft - (115 ft + 3.0 ft)
[38.7 m - (34.8 m + 0.9 m)]
= 9 (2.7 m)

Since maximum bearing is 7.5 ft (2.3 m), bridge will need packing under ETP's.

OR

Digging out of bank from under ETP is necessary.

OR

Total bearing of both banks can be divided by 2 and equal amounts of bearing used under both ends of bridge.

If last option is selected, F peg will have to be moved further from AR peg on far bank.

(c) Check elevation of banks. Measure elevations of AR and AR' in relation to water level, or gap depth, and the elevation of LRB/CRB. Minimum bank height needed to prevent immersing in water or grounding of links is 12.0 ft (3.7 m)

Table 2-7. Minimum Bearing Per Bridge.

AR Gap				Bridge Length			Bearing (minimum)				R Distance	
Minimum		Maximum		2E + No of			A to F		A' to F'			
ft	m	ft	m	Bays	ft	m	ft	m	ft	m	ft	m
94	28.7	103	31.4	13	109	33.2	3.0	0.9	3.0	0.9	91	27.7
100	30.1	109	33.3	14	115	35.1	3.0	0.9	3.0	0.9	95	29.0
106	32.3	114*	34.4*	15	121	36.9	3.5	1.1	3.5	1.1	95	29.0
112	34.1	121	36.9	16	127	38.7	3.0	0.9	3.0	0.9	97	30.0
118	36.0	127	38.7	17	133	40.5	3.0	0.9	3.0	0.9	97	30.0
124	37.8	133	40.6	18	139	42.4	3.0	0.9	3.0	0.9	97	30.0
130	39.6	139	42.4	19	145	44.2	3.0	0.9	3.0	0.9	115	35.1
136	41.5	145	44.2	20	151	46.0	3.0	0.9	3.0	0.9	127	38.7
142	43.3	150	45.6	21	157	47.9	3.75	1.14	3.75	1.14	127	38.7
148	45.1	152.5	46.5	22	163	49.7	5.25	1.6	5.25	1.6	133	40.5

*Due to launching nose length and configuration.

(3) Measure elevations of F, F', LRB, RRB/CRB and O. This enables a base line to be plotted on graph paper, from which nose and tail lift can be computed. Lift is achieved by:

Altering the launch nose cross girders (LNCG) setting.

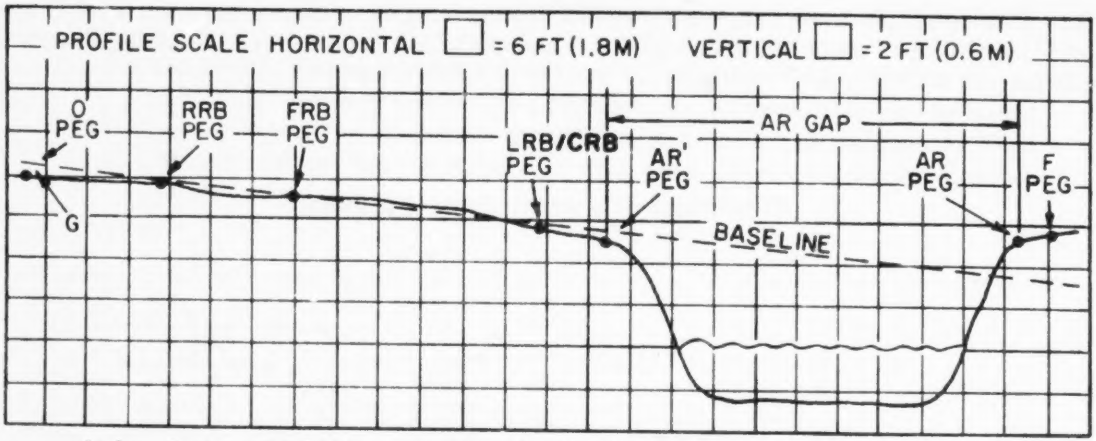
Raising and lowering the LRB/CRB and RRB.

(a) Check that difference in elevation between F and F' (on near bank) does not exceed 1/20 overall chosen bridge length, or that difference in the elevation of each girder (side of bridge) does not exceed 1/20 the width of bridge. If greater than 1/20 bridge length:

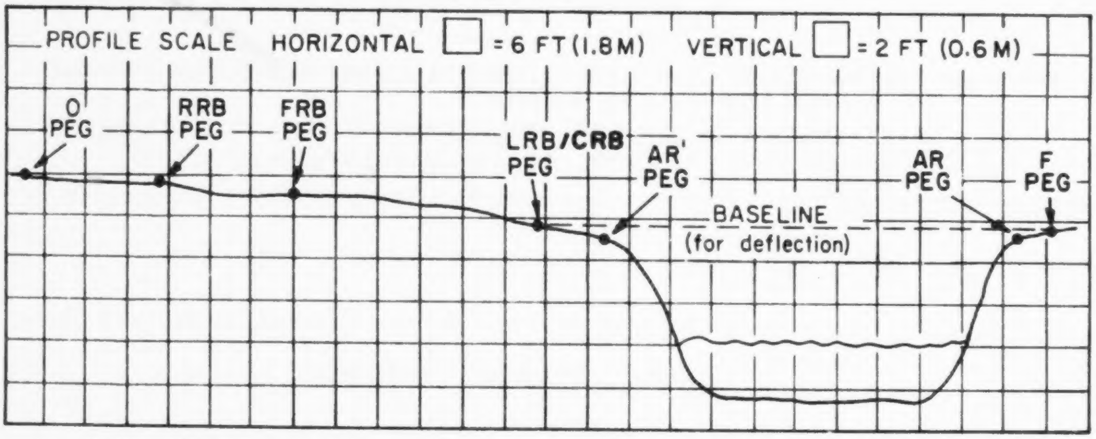
Prepare to crib up lower end of bridge when launched.

OR

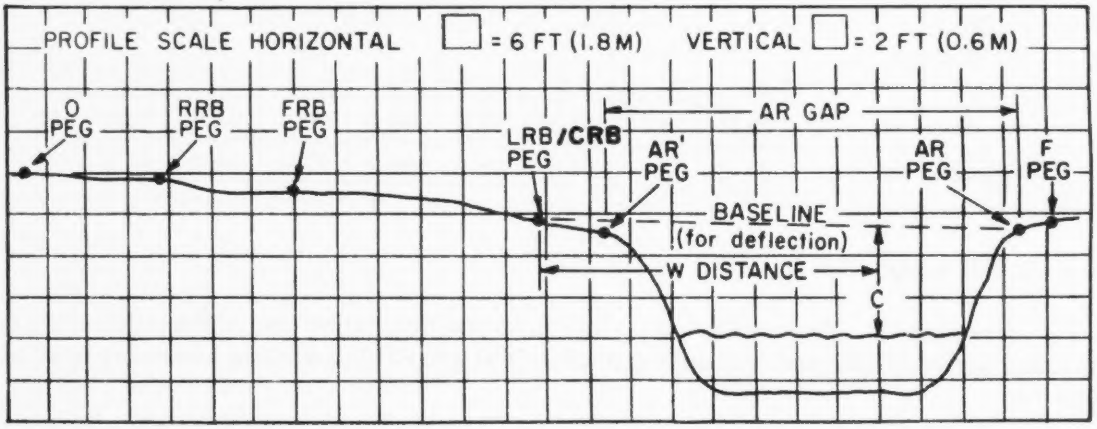
Select new centerline.


PROFILE SCALE HORIZONTAL ☐ = 6 FT (1.8M) VERTICAL ☐ = 2 FT (0.6M)
O PEG
RRB PEG
FRB PEG
LRB/CRB PEG
AR' PEG
AR GAP
AR PEG
F PEG
G
BASELINE

(b) Join LRB/CRB and RRB (establishing base line). Line drawn should extend beyond F and O pegs.


PROFILE SCALE HORIZONTAL ☐ = 6 FT (1.8M) VERTICAL ☐ = 2 FT (0.6 M)
O PEG
RRB PEG
FRB PEG
LRB/CRB PEG
AR' PEG
AR PEG
F PEG
BASELINE (for deflection)

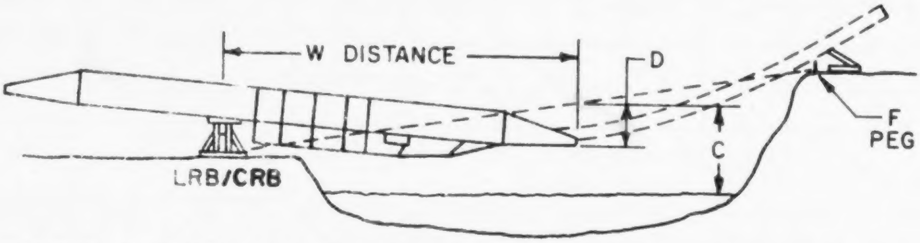
(c) Join LRB/CRB and F (establishing base line used to determine deflection).


PROFILE SCALE HORIZONTAL ☐ = 6 FT (1.8M) VERTICAL ☐ = 2 FT (0.6 M)
O PEG
RRB PEG
FRB PEG
LRB/CRB PEG
AR' PEG
AR GAP
AR PEG
F PEG
BASELINE (for deflection)
W DISTANCE
C

(b) Measure H (far bank height at F relative to base line), G, (distance between point O and base line) and C (distance of water below line joining F and LRB/CRB distance W from LRB/CRB (for W, see Table 2-8).

NOTE

W is found only when water is present.



DEFINITIONS: C-DISTANCE OF WATER LINE BELOW LINE JOINING BANKS AT A DISTANCE W FROM LRB (NEGATIVE NUMBER).
D-DEFLECTION OF ETP LINE JOINING BANKS AT CRITICAL DISTANCE W.
W-DISTANCE OF ETP FROM LRB FOR MAXIMUM DEFLECTION.

Table 2-8. Distance W Per Bridge

Bridge Length 2E + No. of Bays		13	14	15	16	17	18	19	20	21	22
W Distance	ft	70.0	74.0	78.00	82.0	86.0	90.0	94.0	99.0	102.0	105.0
	m	21.3	22.6	23.8	25.0	26.2	27.4	28.7	30.2	31.1	32.0

d. Launch design.

(1) Nose/tail lift. From the following four rules and from tables below compute setting of launch nose cross girder (LNCG) and final setting of LRB/CRB and RRB to achieve necessary nose and tail of bridge lift.

NOTE

On LNCG, setting 4 results in easiest construction. FRB and RRB should remain as low as possible during construction, although they may be raised as necessary (for near bank end of bridge to clear uneven ground.) Final design settings for LRB/CRB and RRB must be set immediately before launch.

Table 2-9. Maximum Deflection

Bridge Length 2E + No. of Bays			D for given nose cross girder setting with LRB/CRB in lowest position.						Distance W	
			6		4		2			
	ft	m	ft	m	ft	m	ft	m	ft	m
13	109	33.2	+ 1.38	+ 0.42	− 0.39	− 0.12	− 2.20	− 0.67	70.0	21.3
14	115	35.1	+ 1.21	+ 0.37	− 0.69	− 0.21	− 2.59	− 0.79	74.1	22.6
15	121	36.9	+ 1.02	+ 0.31	− 0.98	− 0.30	− 2.99	− 0.91	78.1	23.8
16	127	38.7	+ 0.72	+ 0.22	− 1.38	− 0.42	− 3.48	− 1.06	82.0	25.0
17	133	40.5	+ 0.42	+ 0.13	− 1.77	− 0.54	− 4.00	− 1.22	86.0	26.2
18	139	42.4	+ 0.10	+ 0.03	− 2.20	− 0.67	− 4.49	− 1.37	90.0	27.4
19	145	44.2	− 0.30	− 0.09	− 2.69	− 0.82	− 5.09	− 1.55	94.2	28.7
20	151	46.0	− 0.69	− 0.21	− 3.18	− 0.97	− 5.68	− 1.73	99.1	30.2
21	157	47.9	− 1.18	− 0.36	− 3.77	− 1.15	− 6.40	− 1.95	102.0	31.1
22	163	49.7	− 1.77	− 0.54	− 4.49	− 1.37	− 7.18	− 2.19	105.0	32.0

Table 2-10. Nose/Tail Lift

				Dimensions above line through ground LRB/CRB and RRB (base line) when both are in lowest position. Minus sign (–) in front of value indicates below line.									
Bridge Length 2E + No. of Bays			Nose Construction No. of LN (See Note 1)	Nose Tip Height 'N' with Nose Cross Girder at Setting (See Notes 1 and 2)						Tail Height T		Distance R	
				6		4		2					
	ft	m		ft	m	ft	m	ft	m	ft	m	ft	m
13	109	33.2	7N1	– 3.80	– 1.16	2.40	0.73	8.60	2.62	1.31	0.40	91	27.7
14	115	35.1	7N1	– 4.20	– 1.28	2.00	0.61	8.20	2.50	1.21	0.37	95	29.0
15	121	36.9	7N1	– 4.60	– 1.40	1.61	0.49	7.80	2.38	1.11	0.34	95	29.0
16	127	38.7	8N1	– 5.00	– 1.53	1.21	0.37	7.41	2.26	0.99	0.30	97	30.0
17	133	40.5	8N1	– 5.40	– 1.65	0.79	0.24	7.02	2.14	0.89	0.27	97	30.0
18	139	42.4	6N1 + 3N2	– 5.80	– 1.77	0.40	0.12	6.60	2.01	0.69	0.21	97	30.0
19	145	44.2	6N1 + 3N2	– 6.60	– 2.01	– 0.40	0.12	5.81	1.77	0.69	0.21	115	35.1
20	151	46.0	6N1 + 3N2	– 7.20	– 2.20	– 1.02	0.31	5.22	1.59	0.69	0.21	127	38.7
21	157	47.9	6N1 + 3N2	– 7.60	– 2.32	– 1.41	0.43	4.79	1.46	0.60	0.18	127	38.7
22	163	49.7	6N1 + 3N2	– 7.81	– 2.38	– 1.60	0.49	4.60	1.40	0.50	0.15	133	40.5

NOTES

1. Each nose includes a light nose complete.
2. Nose cross girder setting 6, 4, and 2 is position of cross girder resting on 6th, 4th, and 2nd hole from bottom of LNCG post.

RULE 1

LNCG setting permitted to avoid immersion in flowing water.

a. Both bank heights greater than 12.0 ft (3.7 m) no immersion will take place so all settings can be used. Proceed to Rule 2.

b. Still water. Immersion does not matter so all settings can be used. Proceed to Rule 2.

c. Flowing water. Find which settings are permitted.

(1) With LRB/CRB in lowest position, values of C and D will both be negative. Settings 2 and 4 are permitted if the height C is numerically greater than the value of D in Table 2-9 (ignoring signs.) If 2 or 4 are unacceptable, use (2) below.

(2) With LRB/CRB in lowest position setting 6 is always permitted for bridges 13 thru 18 bays long. For bridges 19 thru 22 bays, setting 6 is permitted if the height C is numerically greater than the value of D in Table 2-9. Proceed to Rule 2.

NOTE

If minor errors in level result in immersion to less than 1 ft (0.3 m) in current speeds less 1.64 fps (0.5m/s), it is not essential to adjust launch setting.

RULE 2

LNCG setting to give Nose and Tail Clearance. Select Table 2-9 a setting permitted by rule 1 that gives:

a. N greater than H.

b. T greater than G.

If these requirements are met, select setting with least difference between N and H. If not, proceed to Rule 3.

RULE 3

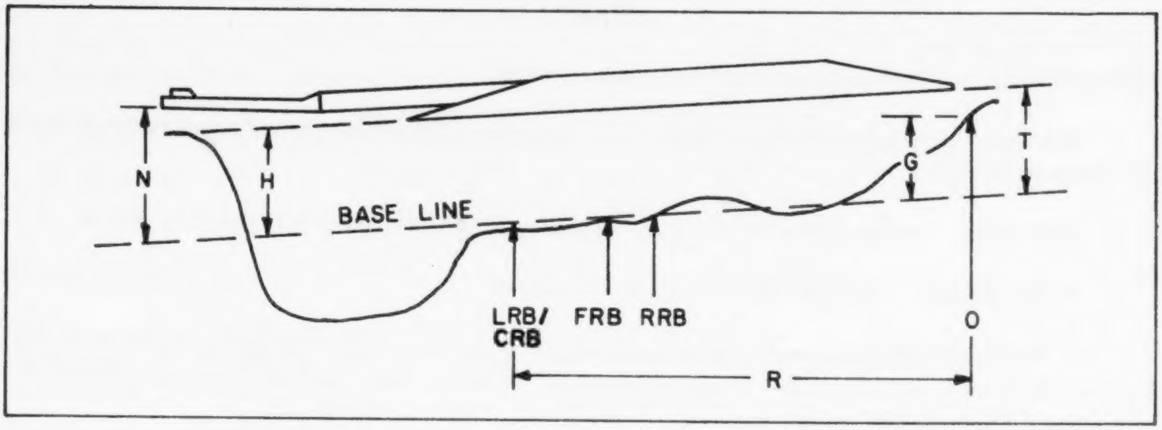
LRB/CRB and RRB setting to increase Nose and Tail Clearance. Raise both LRB/CRB and RRB [maximum lift 2.25 ft (0.69m)]. Check if this addition to N and T is sufficient. See Diagram on page 2-10.

a. If N is insufficient but T is adequate, Rule 4a must be used.

b. If T is insufficient but N is adequate, Rule 4b must be used.

NOTE

Four men can lift Nose by 2 ft (0.6 m) and place it on LRP. This should not be taken into account during design but left to compensate for any inaccuracies in plotting the value of H.



RULE 4

Lowering RRB and LRB/CRB.

a. Lowering RRB. If there is ample tail clearance, some increase in N can be obtained by having LRB/CRB in its highest position and RRB as low as tail clearance permits. This further increases N by approximately 1.75 times available tail clearance, adding the following height to the value of N obtained from Rule 3.

$$1.75\ [(T + 0.69) - G]\ \text{m}$$

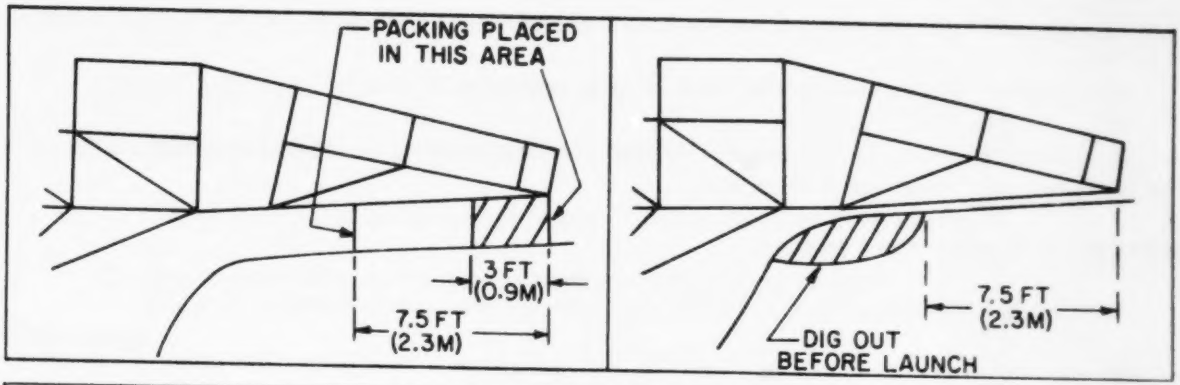
$$1.75\ [T + 2.25) \cdot G)]\ \text{ft}$$

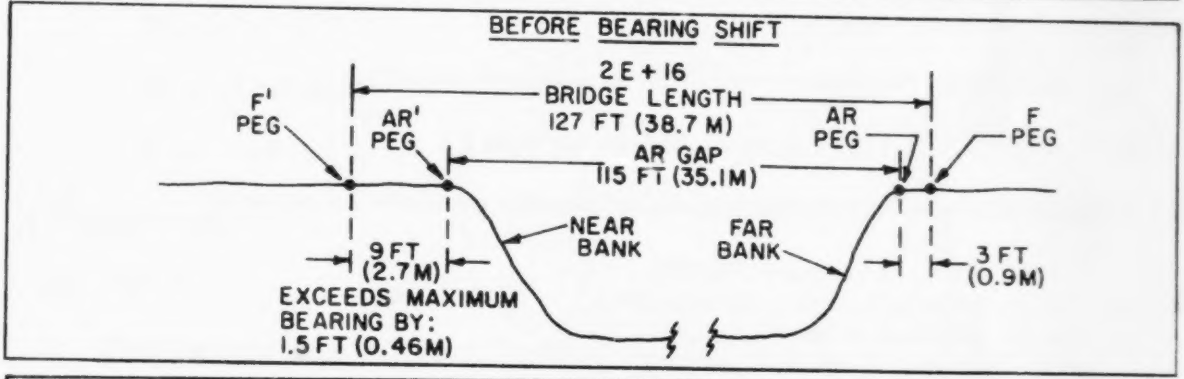
b. Lowering LRB/CRB. If there is amble nose clearance, some increase in T can be obtained by having RRB in its highest position and LRB/CRB as low as nose clearance permits. This further increases T by approximately 0.2 times available nose clearance from Rule 3.

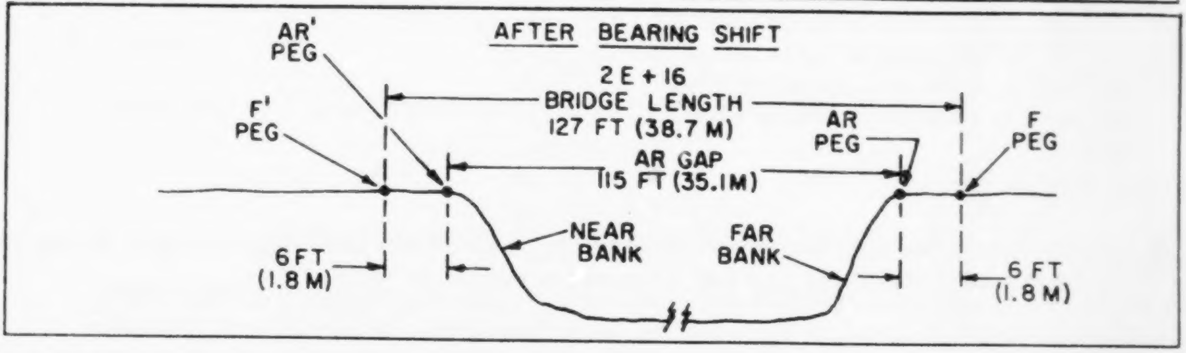
$$0.2\ [(N + 0.69) - H]\ \text{m}$$

$$0.2\ [(N + 2.25) - H]\ \text{ft}$$

e. Bearing Check. Check to ensure that the minimum bearing on the far bank is distance given in Table 2-7 and that the maximum bearing of 7.5 ft (2.3 m) on near bank is not exceeded. If bearing does exceed 7.5 ft (2.3 m), place 3 ft (0.9 m) of packing in area shown, dig out, or shift excess bearing to far bank.


PACKING PLACED IN THIS AREA
3 FT (0.9M)
7.5 FT (2.3M)
7.5 FT (2.3M)
DIG OUT BEFORE LAUNCH


BEFORE BEARING SHIFT
2 E + 16
BRIDGE LENGTH
127 FT (38.7 M)
F' PEG
AR' PEG
AR GAP
115 FT (35.1M)
AR PEG
F PEG
NEAR BANK
FAR BANK
9 FT (2.7M)
3 FT (0.9M)
EXCEEDS MAXIMUM BEARING BY:
1.5 FT (0.46M)


AFTER BEARING SHIFT
AR' PEG
2 E + 16
BRIDGE LENGTH
127 FT (38.7 M)
F' PEG
AR PEG
AR GAP
115 FT (35.1M)
F PEG
NEAR BANK
FAR BANK
6 FT (1.8 M)
6 FT (1.8 M)

EXAMPLE:

DS DESIGN

a. Measure AR gap 134 ft (40.6 m) given.

b. Select bridge (see Table 2-5).

Required MLC 60

Select DS 19 bay 145 ft (44.2 m)

c. Locate and take elevations of key construction and other points, F, F', LRB/CRB, RRB and O.

(1) Locate F. 3 ft (0.9 m) from far bank AR peg, see Table 2-7.

(2) Locate F'. F' = Bridge length - (AR gap + far bank bearing.) If maximum bearing is exceeded, choose option, see paragragh 2-10 c(2)(b).

In this example packing will be used.

(3) Locate LRB/CRB. 9 ft (2.7 m) from near bank AR peg. See paragraph 2-10 c(1)(b).

(4) Locate FRB. 30 ft (9.1 m) LRB/CRB, see paragraph 2-10 c(1) (c). This point is not used in design, but is required on site.

(5) Locate RRB. 15 ft (4.6 m) from FRB, see paragraph 2-10 c (1)(c).

(6) Locate O. 115 ft (35.1 m) from LRB/CRB, see Table 2-7.

ELEVATIONS (Assume no instruments available, therefore elevations are estimated.

F	4.5 ft (1.4 m) above LRB/CRB
LRB/CRB	Reference point – 0.0 elevation
FRB	.5 ft (0.15 m) above LRB/CRB
RRB	1.5 ft (0.45 m) above LRB/CRB
O	3.0 ft (0.9 m) above LRB/CRB
F'	.5 ft (0.15 m) below LRB/CRB
AR	4 ft (1.2 m) above LRB/CRB
AR'	1.5 ft (0.45 m) below LRB/CRB

SLOPE CHECK

F is 5.0 ft (1.1 m) above F'. Maximum height difference for 2E + 19 bay bridge is 6.88 ft (2.1 m), see Table 2-1. 5.0 ft (1.1 m), is less than 6.88 ft (2.1 m) therefore slope is OK.

Plot Cross Selection on Graph Paper (see paragraph 2-10 c(2)(b)

1. Mark LRB/CRB location near center of graph paper.
2. Determine suitable scale, exaggerate vertical scale.
3. Mark location of F, F', FRB, RRB, O, AR, AR', and depth of gap on graph paper.
4. Join all marks with line giving rough profile of site.
5. Using straight edge join LRB/CRB and RRB with line which extends beyond O and F pegs. This is baseline of bridge.
6. Using straight edge join LRB/CRB and F with line to form baseline to check deflection.
7. Draw horizontal line from LRB/CRB over gap, this line is drawn to scale to represent W distance.

The following can now be determined from graph.

Slope check - elevation of F in relation to F'.

H - the vertical distance from base line to F.

G - the vertical distance from base line to O (below baseline is negative)

C - the vertical distance from deflection baseline to water level.

DETERMINE:

H = 8.25 ft (2.5 m)

G = 1.0 ft (0.3 m)

C = 11.5 ft (3.5 m)

d. Launch design.

(1) Rule 1.

Banks greater than 12 ft (3.7 m) therefore proceed to Rule 2.

(2) Rule 2.

Requires: N to be greater than H [from graph H = 8.25 ft (2.5m)].

AND

T to be greater than G [from graph G = – 1.0 ft (0.3 m)].

From Table 2-10, select nose cross girder setting that will give values of N and T greater than H and G, or select setting that is closest to H and G.

Setting 2 provides:

N = 5.81 ft Not greater than 8.25 ft
(1.77 m Not greater than 2.5 m)

T = 0.69 ft Greater than – 1.0 ft
(0.21M Greater than – 0.3 m)

proceed to Rule 3.

(3) Rule 3.

Raise LRB/CRB and RRB.

Lift required: $8.25\text{ ft} - 5.81\text{ ft} = 2.44\text{ ft}$ ($2.5\text{ m} - 1.77\text{ m} = 0.74\text{ m}$)

Maximum lift available by raising both LRB/CRB and RRB is 2.25 ft (0.69 m) therefore:

New $N = 5.81\text{ ft} + 2.25\text{ ft} = 8.06\text{ ft}$
($1.77\text{ m} + 0.69\text{ m} = 2.44\text{ m}$)

$T = 1.0\text{ ft} + 2.25\text{ ft} = 3.25\text{ ft}$
($0.3\text{ m} + 0.69\text{ m} = 0.98\text{ m}$)

N is still not greater than H, but T is much greater than G, proceed to Rule 4a.

(4) Rule 4 a.

Lower RRB.

If lowered maximum amount (where end of bridge touches ground) increased lift.

$$
\begin{aligned}
N &= 5.81 + 1.75\,[(0.69 + 2.25) - (-1.0)]\text{ ft} \\
&= 5.81 + 1.75\,[(2.94) - (-1.0)]\text{ ft} \\
&= 5.81 + 1.75\,(3.94)\text{ ft} \\
&= 5.81 + 6.895\text{ ft} \\
&= 12.705\text{ ft}
\end{aligned}
$$

$$
\begin{aligned}
(N &= 1.77 + 1.75\,[(0.21 + 0.69) - (-0.3)]\text{ m} \\
&= 1.77 + 1.75\,[(0.90) - (-0.3)]\text{ m} \\
&= 1.77 + 1.75\,(1.2)\text{ m} \\
&= 1.77 + 2.1\text{ m} \\
&= 3.87\text{ m})
\end{aligned}
$$

(5) Locate RRB. 15 ft (4.6 m) from FRB, see paragraph 2-10. c (1) (c).

(6) Locate O. 115 ft (35.1 m) from CRB, see Table 2-5.

FINAL DESIGN

DS 19 Bay 145 ft (44.2 m)

LRB/CRB setting (Set LRB/CRB before RRB) Set in highest position immediately before launch.

RRB setting (Set RRB after LRB/CRB) Set in a low to mid position.

Prepare to pack under near bank end of bridge as maximum bearing exceeded.

SECTION III. OPERATION UNDER USUAL CONDITIONS

	Paragraph	Page
Assembly—General	2-11	2-28
Disassembly—General	2-12	2-151
Disassembly on the Original Far Bank	2-13	2-229

2-11. ASSEMBLY

WARNING

Rocking Rollers

Rocking rollers must be in a down or locked position prior to disconnecting the assisting vehicle.

GENERAL:

This section will describe step by step procedures for constructing all lengths of Link Reinforced MGBs. The procedures will start with the assembly of the building frame. Marking of site, pallet off-loading and placement have been covered in earlier sections of this chapter.

Since the assembly procedures are different for each length of bridge, the user will be instructed to proceed to certain steps as required for the bridge that is being built.

EXAMPLE: Constructing a 2E + 16 bay Link Reinforced MGB.

When constructing a 2E + 16 bay steps 1.a. (1) thru 1.1. (9) are performed. At the end of step 1.a. (9) the user is instructed to proceed to step 1.a. (14) for construction of 2E + 13 thru 2E + 15 bay bridges.

Disregard that instruction as the user is constructing a 2E + 16 bay bridge. Continue performing steps until a PROCEED TO instruction is reached that pertains to the bridge being constructed. In this case, after Step 1.a. (9), the user is instructed to PROCEED TO Step 1.a. (14). Do exactly that, DO NOT perform Step 1.a. (10) thru 1.a. (13). These steps are used when constructing other lengths of bridge.

At the end of Step 1.a. (14) there are no instructions to proceed to another step. The user should continue by going to the next step, which in this case is 1.b. (1). The rule to follow is: continue performing the steps in the order they are given, unless instructed to proceed to another step.

Following that rule, the user performs Steps 2.a. (1) thru 2.a. (4).

If the user is in doubt as to the steps to perform, the listing that follows is provided as a quick reference to check the steps used to construct any of the link reinforced bridges.

To use the listing, the user reads down the column of the bridge being constructed, and performs the steps in the order listed.

Using the example of the 2E + 16 bay bridge, the user should perform steps:

1.a. (1) thru (9)
(14)

2-11. ASSEMBLY — Continued

1.b.(1) thru (3)
2.a.(1) thru (4)
(6) thru (9)
(21)
(23) and (24)
(26) and (27)
(29) thru (39)
(41) and (42)
(49) thru (51)
(54)
(62) thru (64)
(70) thru (76)
(80)
(91)
(93) thru (97)
(100)
(102) and (103)
(106)
(108) and (109)
(111) and (112)
(114)
(116) thru (138)

Once the user becomes familiar with the step by step procedures of construction, it will be possible to construct any link reinforced bridge by using the Building and Boom Table 2-12.

This table provides the necessary instructions to construct, boom and launch all bridges.

DO NOT TRY TO USE THIS TABLE UNTIL THE STEP BY STEP PROCEDURES HAVE BEEN PRACTICED A NUMBER OF TIMES.

2-11. ASSEMBLY (Continued)

Table 2-11. Required Steps Per Bridge Length.

2E + 13 bay	2E + 14 bay	2E + 15 bay	2E + 16 bay	2E + 17 bay
Perform Steps 1.a.(1) thru (5) (10) thru (14)	Perform Steps 1.a.(1) thru (5) (10) thru (14)	Perform Steps 1.a.(1) thru (5) (10) thru (14)	Perform Steps 1.a.(1) thru (9) (14)	Perform Steps 1.a.(1) thru (9) (14)
1.b.(1) thru (3)	1.b.(1) thru (3)	1.b.(1) thru (3)	1.b.(1) thru (3)	1.b.(1) thru (3)
2.a.(1) thru (4) (6) thru (8) (21) (23) and (24) (26) and (27) (29) thru (36) (41) (62) and (63) (66) thru (72) (74) thru (76) (80) (93) thru (97) (99) (102) and (103) (105) (108) and (109) (111) thru (113) (116) thru (138)	2.a.(1) thru (4) (6) thru (8) (21) (23) and (24) (26) and (27) (29) thru (37) (41) and (42) (49) (62) and (63) (67) (69) thru (72) (75) and (76) (79) and (80) (93) thru (97) (99) (102) and (103) (105) (108) and (109) (111) thru (113) (116) thru (138)	2.a.(1) thru (4) (6) thru (8) (21) (23) and (24) (26) and (27) (29) thru (38) (41) and (42) (49) thru (51) (54) (62) and (63) (70) and (71) (75) thru (78) (81) and (82) (84) (93) thru (98) (102) thru (105) (108) and (109) (111) thru (113) (113) thru (138)	2.a.(1) thru (4) (6) thru (9) (21) (23) and (24) (26) and (27) (29) thru (39) (41) and (42) (49) thru (51) (54) (62) thru (64) (70) thru (76) (80) (91) (93) thru (97) (100) (102) and (103) (106) (108) and (109) (111) and (112) (114) (116) thru (138)	2.a.(1) thru (4) (6) thru (9) (21) (23) and (24) (26) and (27) (29) thru (42) (49) thru (51) (54) (62) thru (65) (70) thru (76) (88) thru (91) (93) thru (97) (100) (102) and (103) (106) (108) and (109) (111) and (112) (114) (116) thru (138)

2-11. ASSEMBLY (Continued)

Table 2-11. Required Steps Per Bridge Length — Continued

2E + 18 bay	2E + 19 bay	2E + 20 bay	2E + 21 bay	2E + 22 bay
Perform Steps 1.a.(1) thru (9) (14)	Perform Steps 1.a.(1) thru (9) (14)	Perform Steps 1.a.(1) thru (9) (14)	Perform Steps 1.a.(1) thru (9) (14)	Perform Steps 1.a.(1) thru (9) (14)
1.b.(1) thru (3)	1.b.(1) thru (3)	1.b.(1) thru (3)	1.b.(1) thru (3)	1.b.(1) thru (3)
2.a.(1) thru (6) (10) thru (23) (25) and (26) (28) thru (35) (37) thru (40) (42) and (43) (48) thru (51) (54) and (55) (58) (62) and (63) (70) thru (76) (78) (80) (88) and (89) (91) (93) thru (97) (100) (102) and (103) (106) thru (109) (111) and (112) (116) thru (138)	2.a.(1) thru (6) (10) thru (23) (25) and (26) (28) thru (35) (37) thru (40) (42) thru (44) (49) thru (55) (58) and (59) (62) and (63) (70) and (71) (73) (75) thru (77) (79) (81) thru (83) (85) (88) and (89) (91) (93) thru (97) (100) (102) and (103) (106) thru (109) (111) and (112) (114) thru (138)	2.a.(1) thru (6) (10) thru (23) (25) and (26) (28) thru (35) (37) thru (40) (42) thru (45) (49) thru (55) (58) (62) thru (65) (70) thru (76) (78) (80) (88) and (89) (91) (93) thru (97) (100) (102) and (103) (106) thru (109) (111) and (112) (114) thru (138)	2.a.(1) thru (6) (10) thru (23) (25) and (26) (28) thru (35) (37) thru (40) (42) thru (46) (49) thru (51) (54) and (55) (58) and (59) (62) thru (65) (70) thru (76) (81) thru (83) (85) thru (89) (91) thru (97) (101) thru (103) (107) thru (109) (111) and (112) (116) thru (138)	2.a.(1) thru (6) (10) thru (23) (25) and (26) (28) thru (35) (37) thru (40) (42) thru (47) (49) thru (51) (54) and (55) (58) thru (64) (70) thru (73) (75) and (76) (78) thru (83) (87) thru (89) (91) thru (97) (101) thru (103) (107) thru (112) (116) thru (138)

2-11. ASSEMBLY (Continued)

Table 2-12. Building and Boom Table

BRIDGE ft LENGTH m	109 33.2	115 35.1	121 36.9	127 38.7	133 40.5
2E + NO of BAYS	13	14	15	16	17
NOSE CONSTRUCTION	7N1	7N1	7N1	8N1	8N1
BUILD	E + 1	E + 1	E + 1	E + 1	E + 1
MOVE RRB UNDER	1p4	1p4	1p4	1p4	1p4
ADD (CG)	2 + 3 + (5N1 + 4) + 5 + (7N1 + 6) (Ap1)*	2 + 3 + (5N1 + 4) + 5 + (7N1 + 6) (Ap1)*	2 + 3 + (5N1 + 4) + 5 + (7N1 + 6) (Ap1)*	2 + 3 + (5N1 + 4) + 5 + (8N1 + 6) (Ap3)*	2 + 3 + (5N1 + 4) + 5 + (8N1 + 6) (Ap3)*
BOOM TO ADD (CG)	3p0 7 + 8 + 9 (2p5)*	3p0 7 + 8 + 9 (2p5)*	3p0 7 + 8 + 9 (2p5)*	2p7 7 + 8 + 9 (2p3)*	2p7 7 + 8 + 9 (2p3)*
BOOM TO ADD (CG)	4p7 10 + 11 + 12 (4p2)*	4p7 10 + 11 + 12 (4p2)*	4p7 10 + 11 + 12 (4p2)*	4p5 10 + 11 + 12 (4p0)*	4p5 10 + 11 + 12 (4p0)*
BOOM TO ADD (CG)	10p0 AA(L) (4p2)*	10p0 AA(L) (4p2)*	10p0 AA(L) (4p2)*	10p0 AA(L) (4p2)*	10p0 AA(L) (4p2)*
	DO NOT DISCONNECT VEHICLE UNTIL AA(S) HAS BEEN FITTED WHICH WILL REQUIRE CONTINUING BOOM TO 11p0.				
BOOM TO ADD ADD ADD (CG)	11p0 AA(S) 1LL 13 + E (6p0)*	11p0 AA(S) 1LL 13 + 14 + E (6p4)*	11p0 AA(S) 1LL 13 thru E (7p0)*	11p0 AA(S) 1LL 13 thru E (7p2)*	11p0 AA(S) 1LL 13 thru E (7p7)*
BOOM TO ADD		13p6 LT-4p7	13p0 LT-4p7	12p6 LT-4p7	12p6 LT-4p7
BOOM TO ADD ADD ADD		14p0	14p0 PT 1LL + 1SL + 1LL	14p0 PT 3LL	PT 2LL + 1SL
LAUNCH TO POSITION UNDER LZ** ADD ADD	(6p0)* LRP 7	(6p4)* LRP 4 PT 3LL	(7p0)* LRP 3	(7p2)* LRP 7 LT-6p7	(7p6)* LRP 5 LT-6p7 1LL

* = CG is 1 panel point lower if 2 LRPs are placed on light launching nose.
** = Landing Zone

2-11. ASSEMBLY (Continued)

Table 2-12. Building and Boom Table — Continued

BRIDGE ft	109	115	121	127	133
LENGTH m	33.2	35.1	36.9	38.7	40.5
2E + NO of BAYS	13	14	15	16	17
LAUNCH TO	6p2		7p4		
ADD	PT		LT-6p7		
ADD	LT-4p7				
ADD	1LL + 1SL				
ADD	+ 1LL				
LAUNCH TO	7p4	7p4	8p4	9p4	9p4
ADD	LT-6p7	LT-6p7	LT-7p7	LT-8p7	LT-8p7
ADD	AF-7p1	AF-7p1	AF-8p1	AF-9p1	AF-9p1
ADD			1LL	1LL	1LL
REMOVE	LLN-F			LLN-F	LLN-F
LAUNCH TO	8p4	9p4	10p4	11p4	10p4
ADD	LT-7p7	LT-8p7	LT-9p7	LT-10p7	LT-9p7
REMOVE	LLN-R	LLN-F&R	LLN-F	LLN-R	
REMOVE				&1N1	
LAUNCH TO					12p4
ADD					LT-11p7
ADD					LLN-R
ADD					&1N1
LAUNCH TO	10p6	11p6	12p6	13p6	14p6
ADD PT at BAY	9 + 1LL	10 + 1LL	11 + 1LL	12 + 1LL	13 + 1LL
ADD	LT-10p1	LT-11p1	LT-12p1	LT-13p1	LT-14p1
REMOVE	RRB	RRB	RRB	RRB	RRB
REMOVE	1N1	1N1	LN-R	2N1	2N1
LAUNCH TO	12p2	13p2	14p2	15p2	16p2
REMOVE	FRB	FRB	FRB	FRB	FRB
ADD	AA	AA	AA	AA	AA
REMOVE	2N1	2N1	1N1&2N1	3N1	3N1
LAUNCH TO	13p2	14p2	15p2	16p2	17p2
ADD	AA(S)	AA(S)	AA(S)	AA(S)	AA(S)
LAUNCH TO	Dp2	Dp2	Dp2	Dp2	Dp2
ADD	AA(L)	AA(L)	AA(L)	AA(L)	AA(L)
REMOVE	3N1	3N1	3N1	4N1 +	4N1 +

2-11. ASSEMBLY (Continued)

Table 2-12. Building and Boom Table — Continued

BRIDGE ft LENGTH m	139 42.4	145 44.2	151 46.0	157 47.9	163 49.7
2E + NO of BAYS	18	19	20	21	22
NOSE CONSTRUCTION	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2
BUILD	E + 1	E + 1	E + 1	E + 1	E + 1
MOVE RRB UNDER	1p4	1p4	1p4	1p4	1p4
ADD (CG)	2 + 3 + (6N1 + 4) + 5 + (3N2 + 6) + 7 (Ap2)*	2 + 3 + (6N1 + 4) + 5 + (3N2 + 6) + 7 (Ap2)*	2 + 3 + (6N1 + 4) + 5 + (3N2 + 6) + 7 (Ap2)*	2 + 3 + (6N1 + 4) + 5 + (3N2 + 6) + 7 (Ap2)*	2 + 3 + (6N1 + 4) + 5 + (3N2 + 6) + 7 (Ap2)*
BOOM TO ADD (CG)	2p7 8 + 9 + 10 (2p3)*	2p7 8 + 9 + 10 (2p3)*	2p7 8 + 9 + 10 (2p3)*	2p7 8 + 9 + 10 (2p3)*	2p7 8 + 9 + 10 (2p3)*
BOOM TO ADD (CG)	4p5 11 + 12 + 13 (4p0)*	4p5 11 + 12 + 13 (4p0)*	4p5 11 + 12 + 13 (4p0)*	4p5 11 + 12 + 13 (4p0)*	4p5 11 + 12 + 13 (4p0)*
BOOM TO ADD (CG)	10p0 AA(L) (4p0)*	10p0 AA(L) (4p0)*	10p0 AA(L) (4p0)*	10p0 AA(L) (4p0)*	10p0 AA(L) (4p0)*
DO NOT DISCONNECT VEHICLE UNTIL AA(S) HAS BEEN FITTED WHICH WILL REQUIRE CONTINUING BOOM TO 11p0.					
BOOM TO ADD ADD ADD (CG)	11p0 AA(S) 1LL 14 thru 17 (6p0)*	11p0 AA(S) 1LL 14 thru 17 (6p0)*	11p0 AA(S) 1LL 14 thru 17 (6p0)*	11p0 AA(S) 1LL 14 thru 17 (6p0)*	11p0 AA(S) 1LL 14 thru 17 (6p0)*
BOOM TO ADD ADD (CG)	13p0 18 + E LT-4p7 (7p7)*	13p0 18 + 19 LT-4p7 (7p0)*	13p0 18 thru 20 LT-4p7 (7p4)*	13p0 18 thru 21 LT-4p7 (8p0)*	13p0 18 thru 22 LT-4p7 (8p4)*
BOOM TO ADD ADD ADD CG	14p0 PT 3LL (8p0)*	14p0 PT E + 8D 2LL + 1SL (8p5)*	14p0 PT E + 20D 3LL (9p6)*	14p0 PT 3LL 8p0)*	14p0 PT 3LL (8p4)*

* = CG is 1 panel point lower if 2 LRPs are placed on light launching nose.

2-11. ASSEMBLY (Continued)

Table 2-12. Building and Boom Table — Continued

BRIDGE ft	139	145	151	157	163
LENGTH m	42.4	44.2	46.0	47.9	49.7
2E + NO of BAYS	18	19	20	21	22
BOOM TO	15p0	15p0	15p0	15p0	15p4
ADD				E + 3D	
ADD	LT-6p7	LT-6p7	LT-6p7	LT-6p7	LT-6p7
ADD				E + 3D	E + 3D
ADD		1LL		1SL	1LL
(CG)				(9p4)*	(10p0)*
LAUNCH TO	(8p0)*	(8p5)*	(9p6)*	(9p4)*	(10p0)*
POSITION	LRP	LRP	LRP	LRP	LRP
UNDER LZ**	9	7	7	2	2
ADD			LT-8p7	LT-8p7	LT-8p7
ADD			1LL	1LL	
LAUNCH TO	9p4	9p4			
ADD	LT-8p7	LT-8p7			
ADD	AF-9p1				
ADD	1LL	1LL			
REMOVE	LLN-F				
LAUNCH TO		10p4	11p4	11p4	11p4
ADD		LT-9p7	LT-10p7	LT-10p7	LT-10p7
ADD		AF-10p1	AF-11p1	AF-11p1	AF-11p1
ADD			1LL	1LL	1LL
REMOVE		LLN-F	LLN-F	LLN-F	
LAUNCH TO	11p4	12p4	13p4	12p4	13p4
ADD	LT-10p7	LT-11p7	LT-12p7	LT-11p7	LT-12p7
ADD	1LL	1LL	1LL		1LL
REMOVE	LLN-R	LLN-R	LLN-R	LLN-R	LLN-F &R
LAUNCH TO				14p4	15p0
ADD				LT-13p7	LT-14p7
ADD				1LL	1LL
ADD					37D + 6C
REMOVE				LLN-R	
LAUNCH TO				15p0	
ADD				27D + 6C	
LAUNCH TO	13p4	14p4	15p4	16p4	17p4
ADD	LT-12p7	LT-13p7	LT-14p7	LT-15p7	LT-16p7
REMOVE	1N1	1N1	1N1	1N1 +	1N1 +
REMOVE				2N1	2N1

* = CG is 1 panel point if 2 LRPs are placed on light launching nose

** = Landing Zone

2-11. ASSEMBLY (Continued)

Table 2-12. Building and Boom Table — Continued

LAUNCH TO ADD PT at BAY ADD REMOVE REMOVE	15p6 14 + 1LL LT-15p1 RRB 2N1	16p6 15 + 1LL LT-16p1 RRB 2N1	17p6 16 + 1LL LT-17p1 RRB 2N1	18p6 17 + 1LL LT-18p1 RRB 3N1	19p6 18 + 1LL LT-19p1 RRB 3N1
LAUNCH TO REMOVE ADD REMOVE	17p2 FRB AA 3N1&4N1	18p2 FRB AA 3N1&4N1	19p2 FRB AA 3N1&4N1	20p2 FRB AA 4N1	21p2 FRB AA 4N1
LAUNCH TO ADD REMOVE	18p2 AA(S)	19p2 AA(S)	20p2 AA(S)	21p2 AA(S)	22p2 AA(S) 5N1
LAUNCH TO ADD REMOVE	Dp2 AA(L)	Dp2 AA(L) 5N1	Dp2 AA(L) 5N1	Dp2 AA(L) 5N1	Dp2 AA(L)

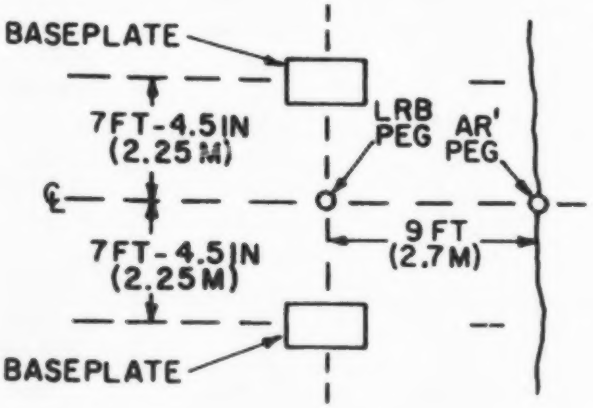
For Link Reinforced MGB, PROCEED TO STEP 1.

Step 1. Setting up Roller Beams

Steps needed to set up and align the roller beams are as follows:

a. Setting up LRB/CRB, FRB and RRB.

1 Put two double story baseplates on site as shown.



NOTE

Placement of baseplates at this distance from AR' peg is required to provide enough working area for attachment of link components.

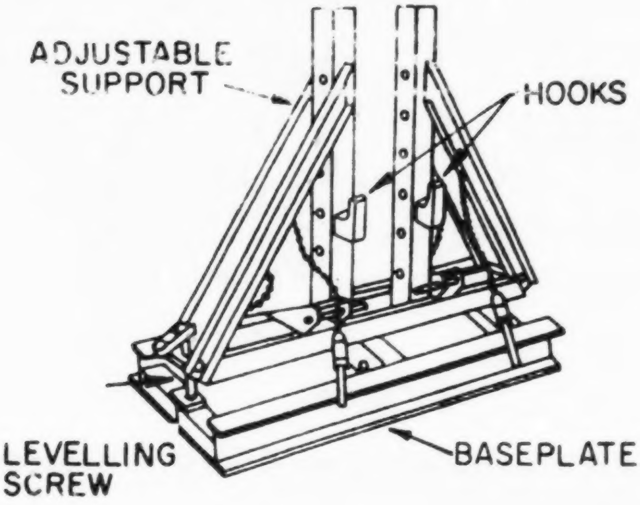
2-11. ASSEMBLY (Continued)

Step 1.a. Setting up Roller Beams (Continued).

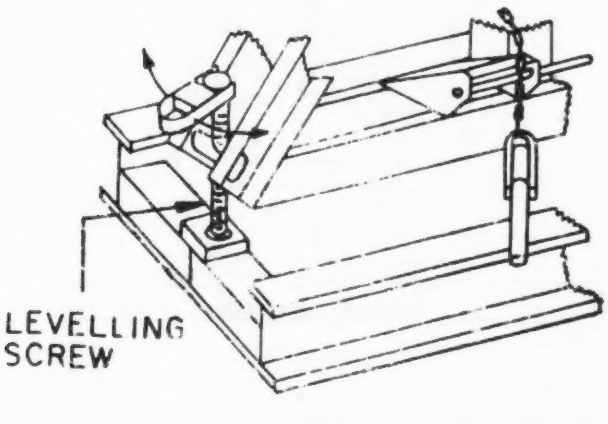
2 Position and hold a roller beam adjustable support on each baseplate.

(a) Ensure that hooks on supports face centerline.

(b) Seat levelling screws in holes of baseplates.


ADJUSTABLE SUPPORT
HOOKS
LEVELLING SCREW
BASEPLATE

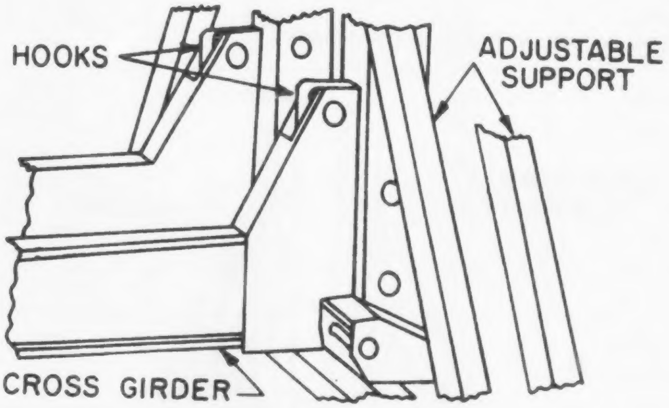
(c) Turn the front or rear adjustable support levelling screws into the baseplate sockets so that adjustable support is vertical. Allow 1/4 in (6 mm) space between screw and socket so that the support may rock back and forth on the pivot (front to rear).


LEVELLING SCREW

2-11. ASSEMBLY (Continued)

Step 1.a. Setting up Roller Beams (Continued).

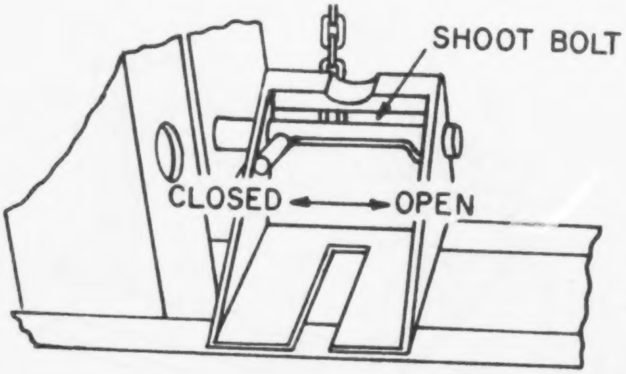
3 Hook a building frame cross girder on adjustable supports for LRB/CRB.


HOOKS
ADJUSTABLE SUPPORT
CROSS GIRDER

NOTE

One of the supports may have to be moved slightly so both ends of the cross girder can be attached.

4 Push shoot bolts through each cross girder and support brackets.


SHOOT BOLT
CLOSED
OPEN

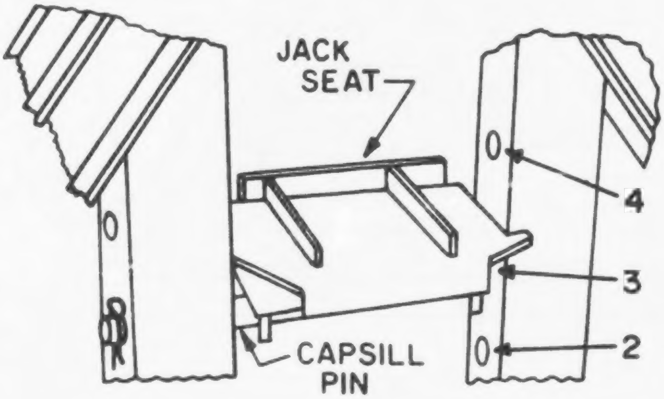
2-11. ASSEMBLY (Continued)

Step 1.a. Setting up Roller Beams (Continued).

5 Place a capsill pin in the third hole of the adjustable support. Place a jack seat over the capsill pin. Secure with retainer clips.

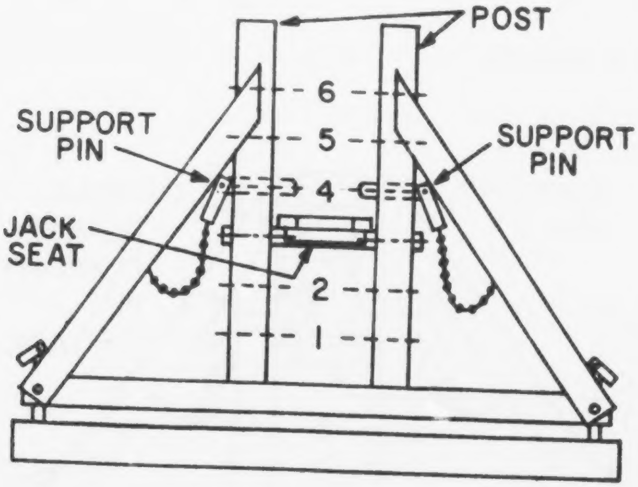
(a) Capsill pin is never used in holes 4, 5, or 6. Place a jack seat over the capsill pin in each adjustable support.

(b) Open end of U-shaped ridge faces away from centerline.



For 2E + 13 thru 2E + 15 bay bridges, PROCEED TO STEP 1.a. 10.

6 Place a support pin in each post of the adjustable support. The support pin must be placed in the fourth hole from the bottom.



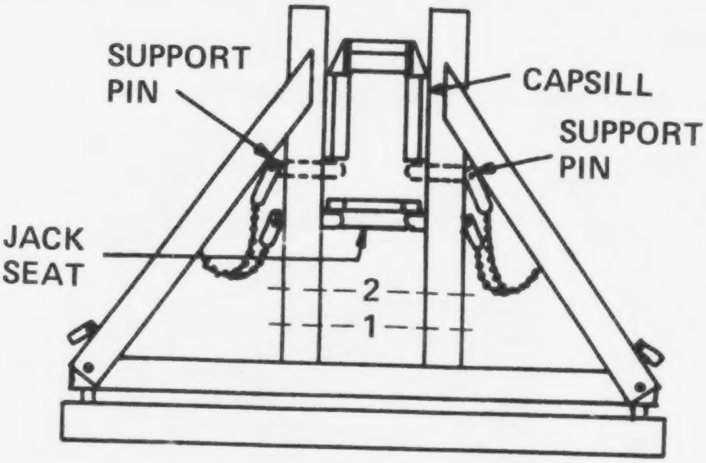
NOTE

Positioning of support pins in fourth hole will permit easy installation of hydraulic jack.

2-11. ASSEMBLY — Continued

Step 1.a. Setting up Roller Beams (Continued).

7 Place a bridging capsill onto the support pin.


SUPPORT PIN
CAPSILL
SUPPORT PIN
JACK SEAT
2
1

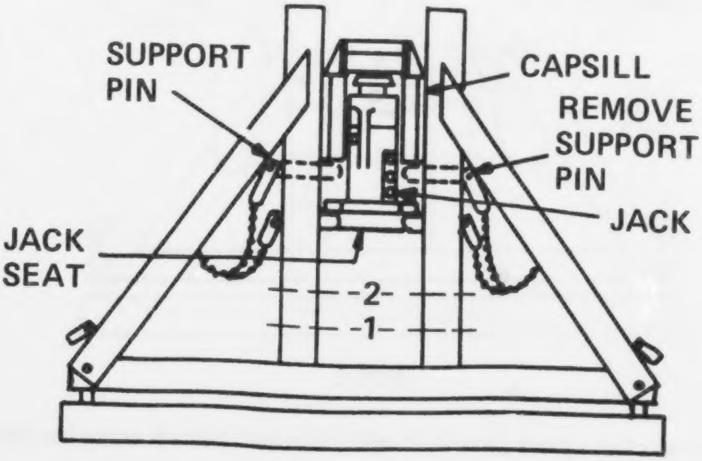
NOTE

The capsill must be put in from the top of the post. Fixed pins prevent sliding capsill in from the side.

8 Place a hydraulic jack (15 ton) on each jack seat.

(a) Operate hydraulic jack to raise capsill off of support pins.

(b) Do not remove support pins.


SUPPORT PIN
CAPSILL
REMOVE SUPPORT PIN
JACK
JACK SEAT
-2-
-1-

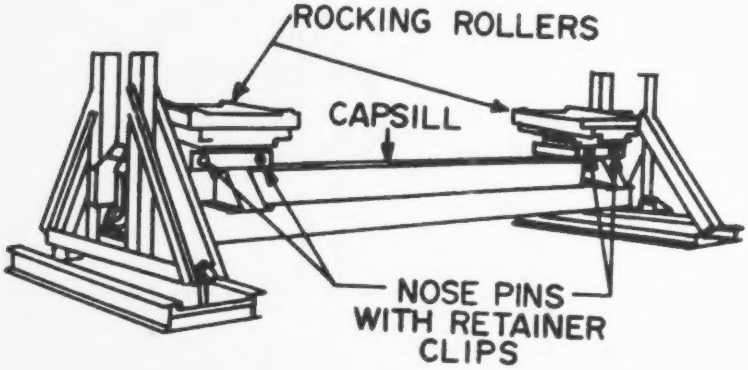
2-11. ASSEMBLY (Continued)

Step 1.a. Setting up Roller Beams (Continued).

9 Place a rocking roller at each end of the capsill.

(a) Secure to capsill with nose pin.

(b) Insert retainer clip through the end of the nose pin.


ROCKING ROLLERS
CAPSILL
NOSE PINS WITH RETAINER CLIPS

NOTE

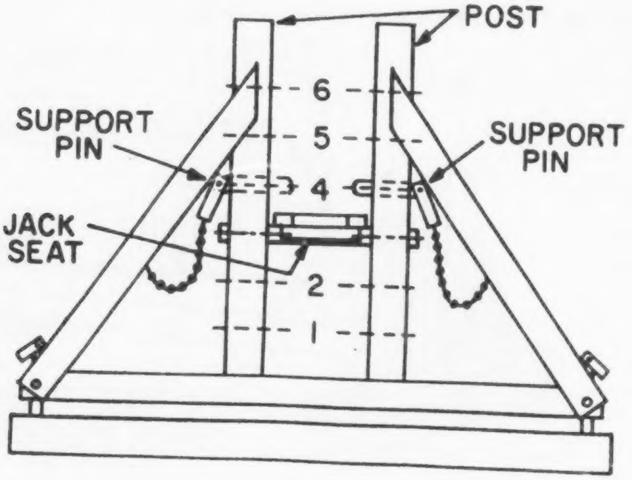
This assembly is now called the capsill roller beam (CRB).

For 2E + 16 thru 2E + 22 bay bridges, PROCEED TO STEP 1.a. 14.

2-11. ASSEMBLY (Continued)

Step 1.a. Setting up Roller Beams (Continued).

10 Place a support pin in each post of the adjustable support. The support pin must be placed in the fourth hole from the bottom.



NOTE

Positioning of support pins in fourth hole will permit easy installation of hydraulic jack.

11 Place a roller beam into the adjustable support.

(a) If site conditions permit, roller beam can be slid into supports from the side. Ensure that retractable pins are fully seated (pushed in) to clear the supports.

(b) If site conditions do not permit sliding the roller beam it will be put into adjustable support by lfiting beam above the tops of the post, then lowering until beam sets at bottom of post.

(c) In either case, ensure that the retractable pins are pushed out to lock beam into support once fixed are butted against posts of support.

12 Raise jack hook on each end of roller beam.

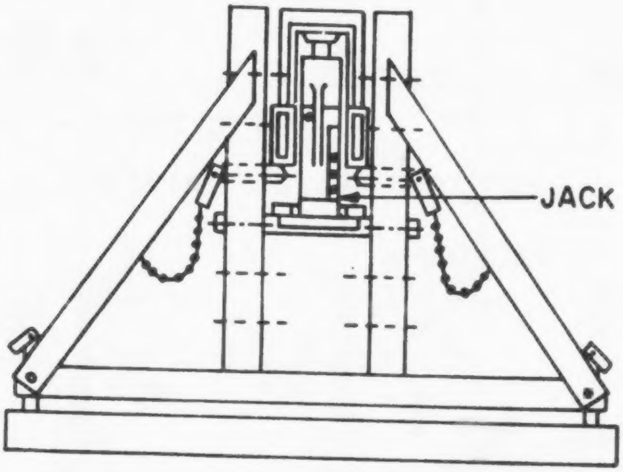
2-11. ASSEMBLY (Continued)

Step 1.a. Setting up Roller Beams (Continued).

13 Place a hydraulic jack (15 ton) on each jack seat.

(a) Operate hydraulic jack to raise roller beam 1/2 in (13 mm).

(b) Do not remove support pins.



NOTE

This assembly is now called the launching roller beam (LRB).

For all link reinforced MGB, PROCEED TO STEP 14.

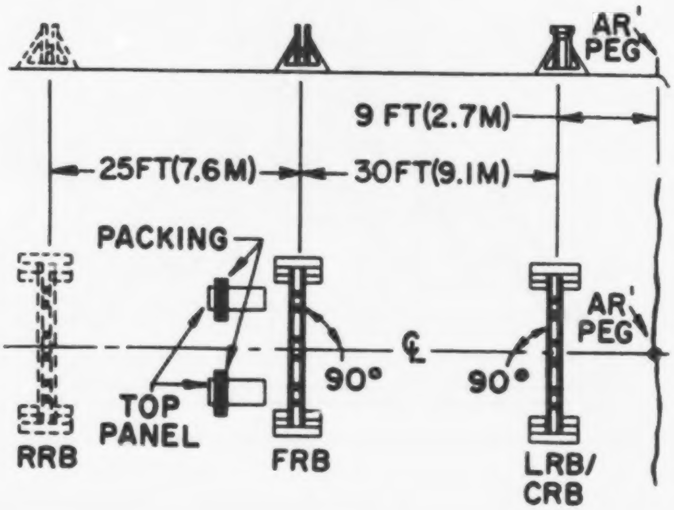
2-11. ASSEMBLY (Continued)

Step 1.a. Setting up Roller Beams (Continued).

14 Assemble the FRB and RRB and position these on site as shown.

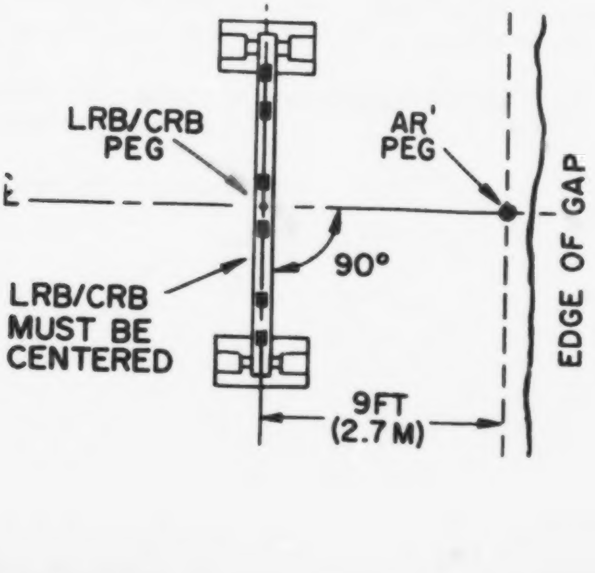
(a) Place two top panels behind outer rollers of FRB.

(b) Place one piece of packing (3 in x 9 in x 36 in) on top of each panel.


AR' PEG
9 FT(2.7M)
25FT(7.6M)
30FT(9.1M)
PACKING
AR' PEG
℄
90°
90°
TOP PANEL
RRB
FRB
LRB/ CRB

b. Aligning the Roller Beams

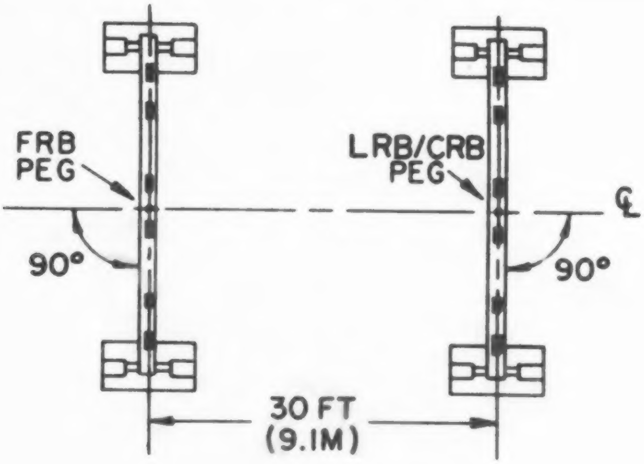
1 Ensure that the center of LRB/CRB is over centerline of bridge. If it is not, pull on baseplates until center of LRB/CRB is directly over LRB/CRB peg. Ensure that LRB/CRB is at right angle (90°) to centerline of bridge.


LRB/CRB PEG
AR' PEG
℄
EDGE OF GAP
90°
LRB/CRB MUST BE CENTERED
9FT (2.7M)

2-11. ASSEMBLY (Continued)

b. Aligning the Roller Beams (Continued).

2 Ensure that the center of FRB is over centerline of bridge. If it is not, pull on baseplates until center of FRB is directly over FRB peg. Ensure that FRB is at right angle (90°) to centerline of bridge.



3 The RRB does not have to be centered or levelled. The location of it at 25 ft (7.6 m) is only an approximate requirement. Later, during construction the RRB will be moved forward under the partially assembled bridge. At that time the RRB will be levelled, centered, and rollers will be locked.

CAUTION

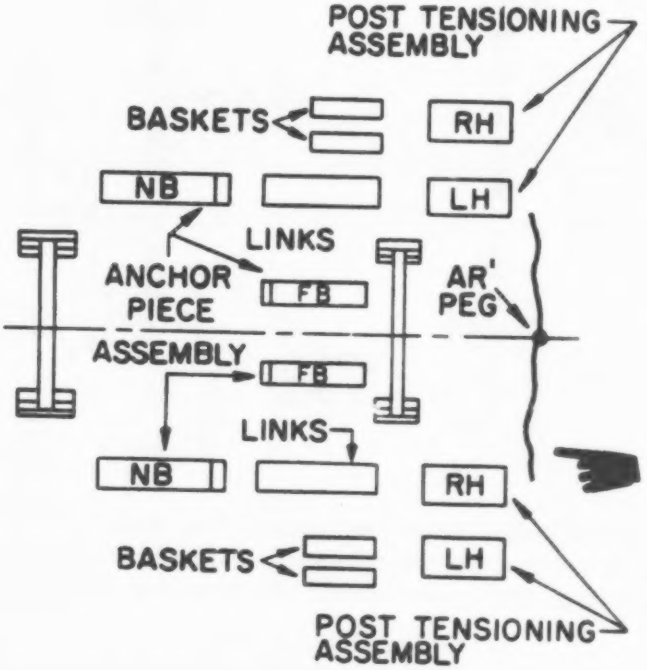
It is very important that all of the roller beams be correctly positioned at this time. If they are not, serious problems will arise later during construction. These problems range from skewing of the bridge off of the centerline to possible damaging of the bridge and roller beams.

2-11. ASSEMBLY (Continued)

Step 2. Assembly of Link Reinforced DS MGB 10.9 ft (33.2 m) thru 163 ft (49.7 m)

a. Assembly Procedures

1 Position link components on site in preparation for assembly. (one example shown)


POST TENSIONING ASSEMBLY
BASKETS
RH
NB
LH
LINKS
ANCHOR PIECE ASSEMBLY
FB
AR' PEG
FB
LINKS
NB
RH
BASKETS
LH
POST TENSIONING ASSEMBLY

(a) Post tensioning assemblies.

1) Ensure that assemblies, right hand (RH) and left hand (LH) are positioned as shown.

2) Ensure that assemblies are complete and ready for operation.

(b) Anchor piece assemblies.

1) Ensure that assemblies, far bank (FB) and near bank (NB), are positioned correctly. FB assemblies are positioned with junction block farthest from LRB/CRB. NB assemblies are positioned with junction blocks facing edge of gap.

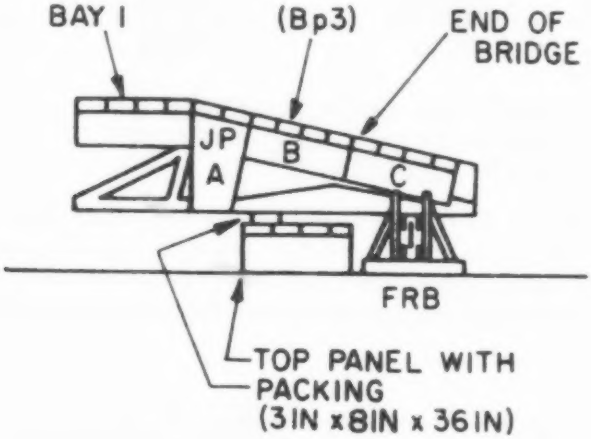
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

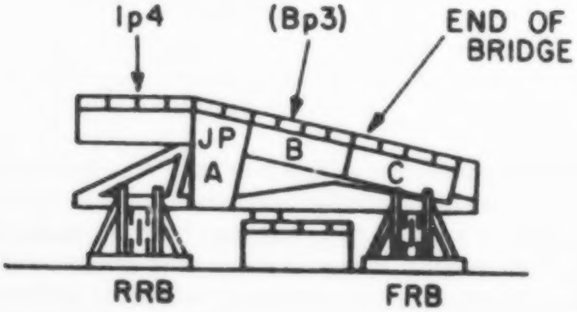
2) Ensure that assemblies are complete.

(c) Links should be stacked one on top of another. The last one required should be on the bottom, the first one on top. Ensure that they are stacked with the male and female guides facing in the direction needed for connection to the link or block that will precede it.

2 Assemble the end of bridge and first bay in the same way as is done when constructing a 2E + 12 Bay DS. Pin nose roller to BSB.


BAY 1
(Bp3)
END OF BRIDGE
JP
A
B
C
FRB
TOP PANEL WITH PACKING (3IN x 8IN x 36IN)

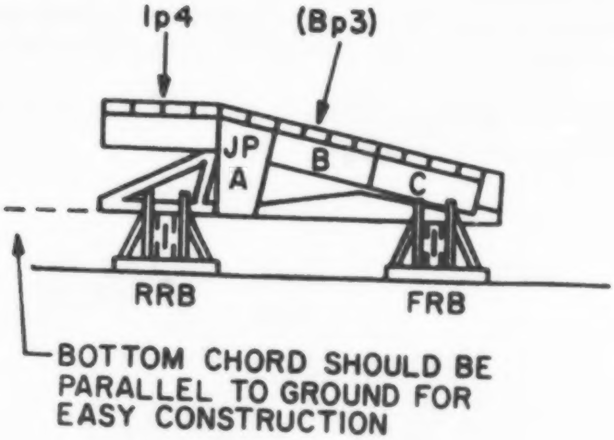
(a) Position RRB under panel joint 1p4. Check to ensure that rollers of FRB and RRB are locked.


1p4
(Bp3)
END OF BRIDGE
JP
A
B
C
RRB
FRB

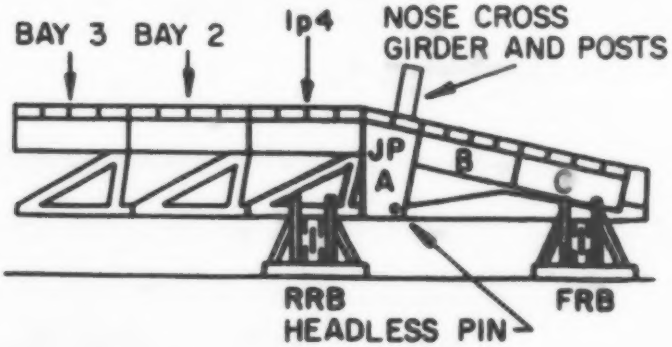
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(b) Adjust height and level FRB and RRB to suitable height for easy construction. Remove top panel and packing. Ensure that sway braces are installed in the end of bridge only.


Ip4
(Bp3)
JP
A
B
C
RRB
FRB
BOTTOM CHORD SHOULD BE PARALLEL TO GROUND FOR EASY CONSTRUCTION

3 Assemble bays 2 and 3 in the same way as is done when constructing a 2E + 12 Bay DS. Fit nose cross girder post to headless pin in junction panel. Pin nose cross girder to post at design height.


BAY 3
BAY 2
Ip4
NOSE CROSS GIRDER AND POSTS
JP
A
B
C
RRB
FRB
HEADLESS PIN

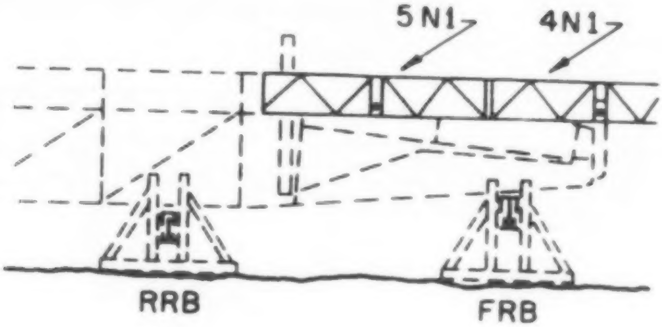
NOTE

The bottom panel pins at 1p0 and 2p0 (in all bridges) must be watched to ensure that they remain fully seated in pin jaws. Also, the bottom panel pins in both ends of the last bottom panel of the bridge must remain fully seated. If any of these pins are allowed to creep out during assembly difficulty in attaching the anchor assemblies will arise. The panel pin will not stick through the bottom panel far enough to put a retainer clip on it after the fork end anchor are fitted.

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

4 Assemble the launching nose until the fifth heavy nose section is connected and boomed.

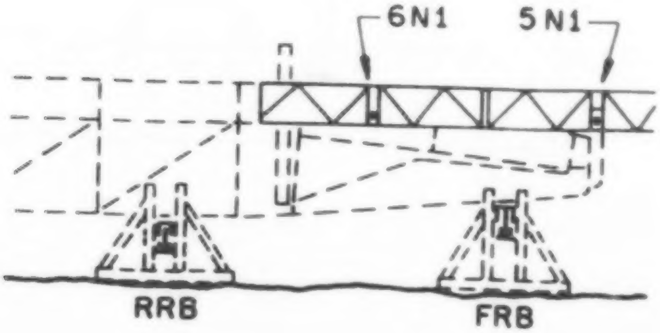


NOTE

During assembly, both landing roller pedestals (LRP) MK2, hydraulic jacks (20 ton) (fully extended), jack handles and four pieces of (3 in x 8 in x 36 in) packing are secured on the light nose with tie-down straps. If two LRP's are not available, one LRP will be used.

For 2E + 13 thru 2E + 17 bay bridges, PROCEED TO STEP 2.a. 6.

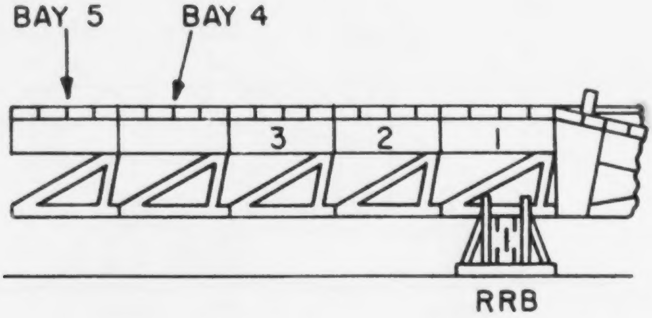
5 Pin the sixth heavy nose section in place and boom it forward.



2-11. ASSEMBLY (Continued)

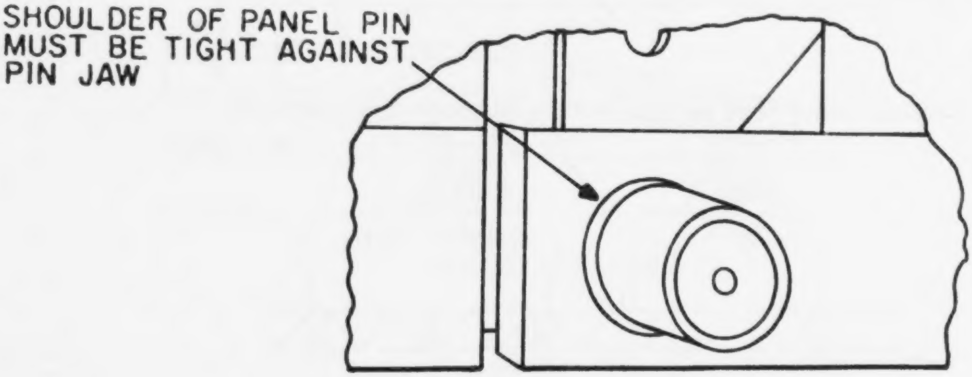
Step 2.a. Assembly Procedures (Continued).

6 Assemble bays 4 and 5 in the same way as is done when constructing a 2E + 12 Bay DS.



NOTE

The bottom panel pins at 5p0 and 6p0 (in all bridges) must be watched to ensure that they remain fully seated in pin jaws. Also, the bottom panel pins at the panel points listed below must be watched. If any of these pins are allowed to creep out during construction, difficulty in attaching the post tensioning assembly will arise. The shoulder of the panel pin will not permit the upper jaws of the post tensioning assembly to attach to the pin correctly.



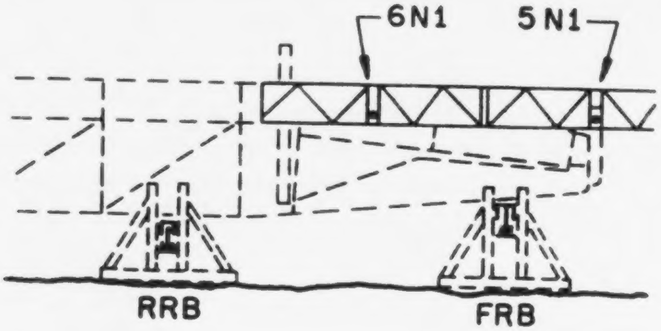
Bridge Length	Watch Pins at Panel Points	Bridge Length	Watch Pins at Panel Points
2E + 13	9p0 and 10p0	2E + 18	14p0 and 15p0
2E + 14	10p0 and 11p0	2E + 19	15p0 and 16p0
2E + 15	11p0 and 12p0	2E + 20	16p0 and 17p0
2E + 16	12p0 and 13p0	2E + 21	17p0 and 18p0
2E + 17	13p0 and 14p0	2E + 22	18p0 and 19p0

2-11. ASSEMBLY (Continued)

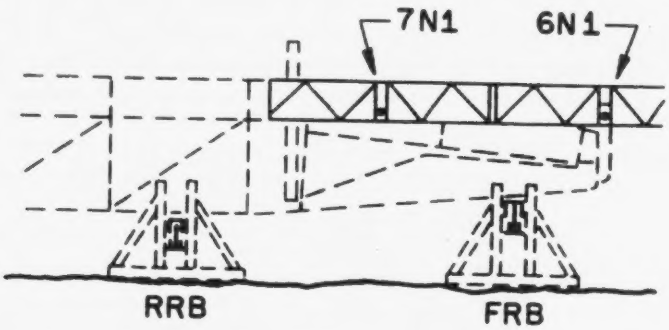
Step 2.a. Assembly Procedures (Continued).

For 2E + 18 thru 2E + 22 bay bridges, PROCEED TO STEP 2.a. 10 .

7 Pin the sixth heavy nose (6N1) section in place.

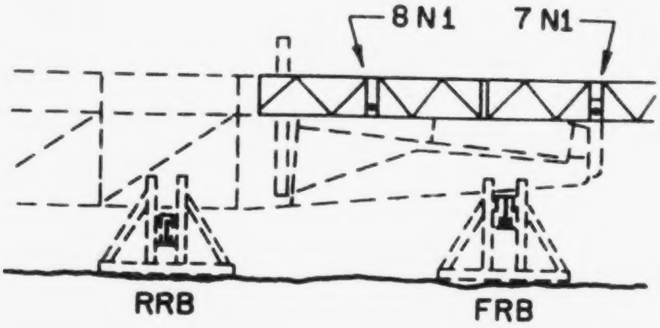


8 Pin seventh heavy nose (7N1) section in place. For 2E + 13 thru 2E + 15 bay bridges, install sway braces in all bays.



For 2E + 13 thru 2E + 15 bay bridges, PROCEED TO STEP 2.a. 21 .

9 Pin eighth heavy nose (8N1) section in place. For 2E + 16 and 2E + 17 bay bridges, install sway braces in all bays.



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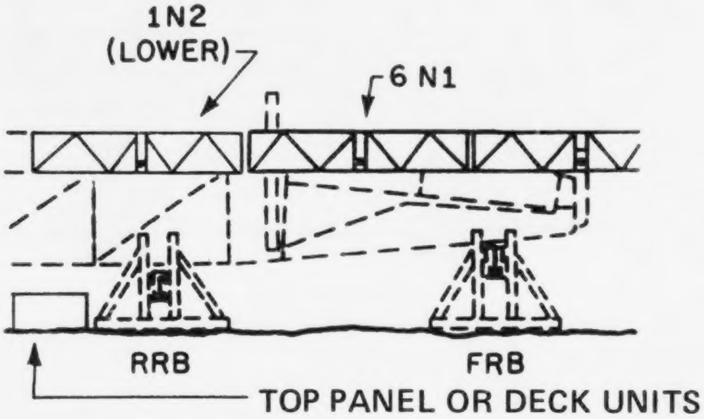
2-11. ASSEMBLY (Continued)

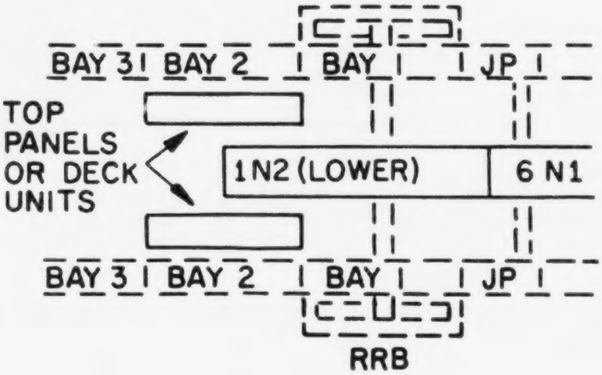
Step 2.a. Assembly Procedures (Continued).

For 2E + 16 and 2E + 17 bay bridges, PROCEED TO STEP 2.a. 21 .

10 Pin first double story nose section (1N2) to the rear of sixth nose section (6N1). DO NOT move nose at this time.


1N2
(LOWER)
6 N1
RRB
FRB
TOP PANEL OR DECK UNITS

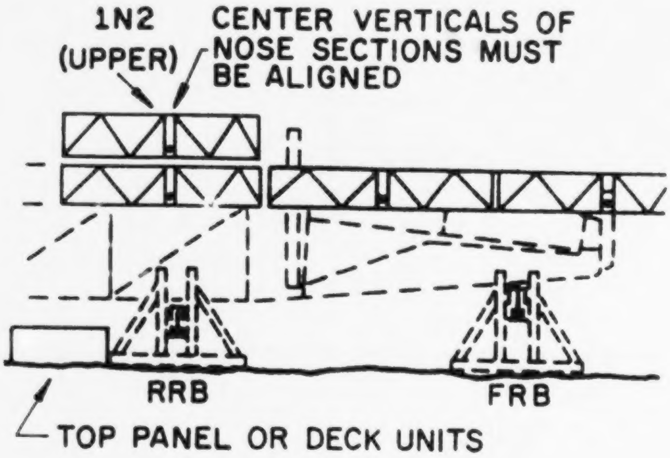
11 Place two top panels (or four deck units) on ground to each side of first nose section. Carrying crews will use these to step up on so they will be able to lift second nose section high enough.


BAY 3
BAY 2
BAY 1
JP
TOP PANELS OR DECK UNITS
1N2 (LOWER)
6 N1
BAY 3
BAY 2
BAY 1
JP
RRB

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

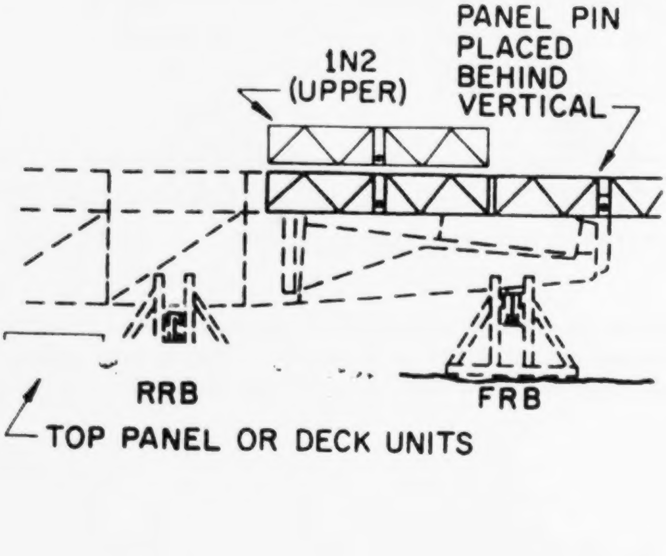
12 Put second nose section (1N2) of double story nose on top of first nose (1N2).


1N2
(UPPER)
CENTER VERTICALS OF NOSE SECTIONS MUST BE ALIGNED
RRB
FRB
TOP PANEL OR DECK UNITS

NOTE

Center verticals of nose sections must be aligned. Failure to do so may result in damage to nose sections.

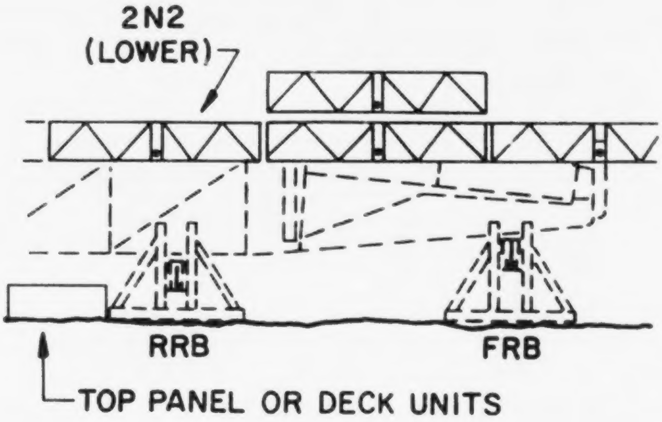
13 Lift gravity catch, remove pin from anchorage tube and move nose forward until the vertical of sixth nose section is in front of holes in nose roller. Insert panel pin through holes in nose roller and allow nose to seat against this pin. DO NOT put the panel pin through the anchorage tube.


PANEL PIN PLACED BEHIND VERTICAL
1N2
(UPPER)
RRB
FRB
TOP PANEL OR DECK UNITS

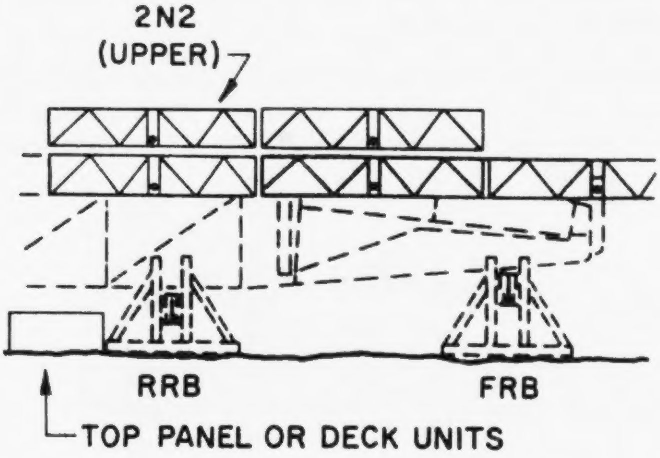
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

14 Pin third double story nose section (2N2) to first nose section (1N2). DO NOT move nose at this time.


2N2
(LOWER)
RRB
FRB
TOP PANEL OR DECK UNITS

15 Put fourth nose section (2N2) of double story nose on top of third nose section (2N2).

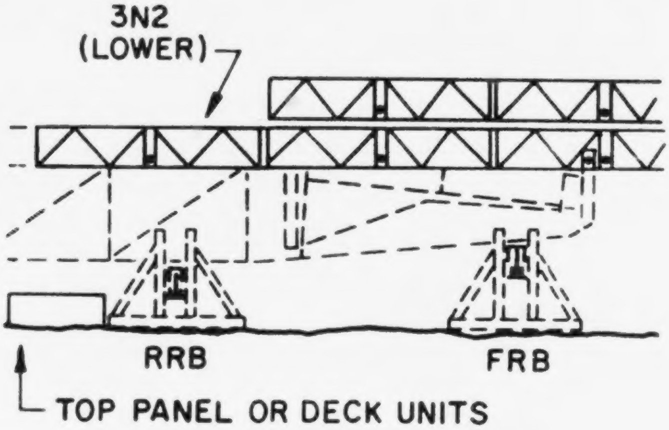

2N2
(UPPER)
RRB
FRB
TOP PANEL OR DECK UNITS

16 Lift gravity catch, remove panel pin from nose roller and move nose forward until front vertical of first double story nose section (1N2) is in front of holes in nose roller. Insert panel pin through holes in nose roller and allow nose to seat against this pin. DO NOT put pin through the anchorage tube.

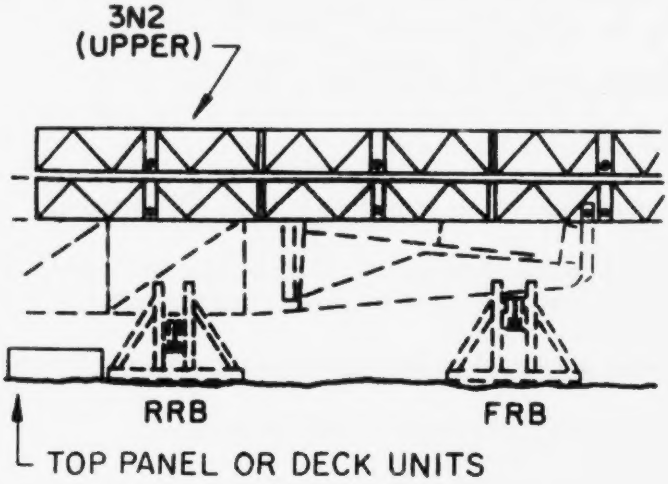
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

17 Pin fifth double story nose section (3N2) to third nose section (2N2). DO NOT move nose at this time.


3N2
(LOWER)
RRB
FRB
TOP PANEL OR DECK UNITS

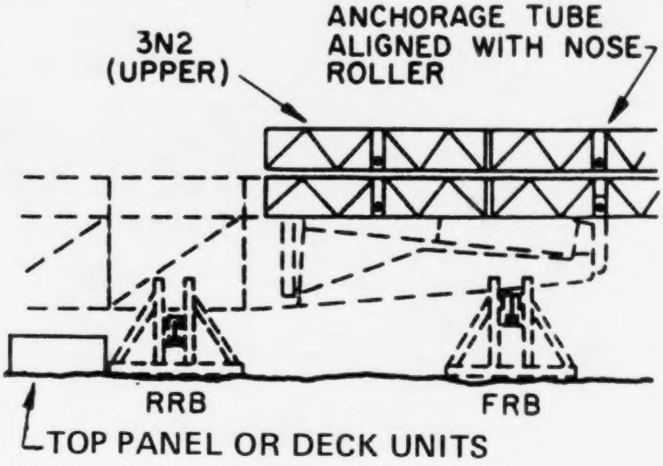
18 Put sixth nose section (3N2) of double story nose on top of fifth nose section (3N2).


3N2
(UPPER)
RRB
FRB
TOP PANEL OR DECK UNITS

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

19 Lift gravity catch, remove panel pin from nose roller and move nose forward until anchorage tube of lower nose section of 2N2 is aligned with holes in nose roller.



NOTE

Center crew will hold nose in this position until panel pin and first nose link is in place.

20 Add nose links on each side of nose sections.

(a) Put panel pin through one link as shown below.

(b) Insert headless pin through anchorage tube of upper nose section.

(c) Insert panel pin (with link through hole in nose roller and anchorage tube of lower nose section. Guide elongated hole in link over end of headless pin.

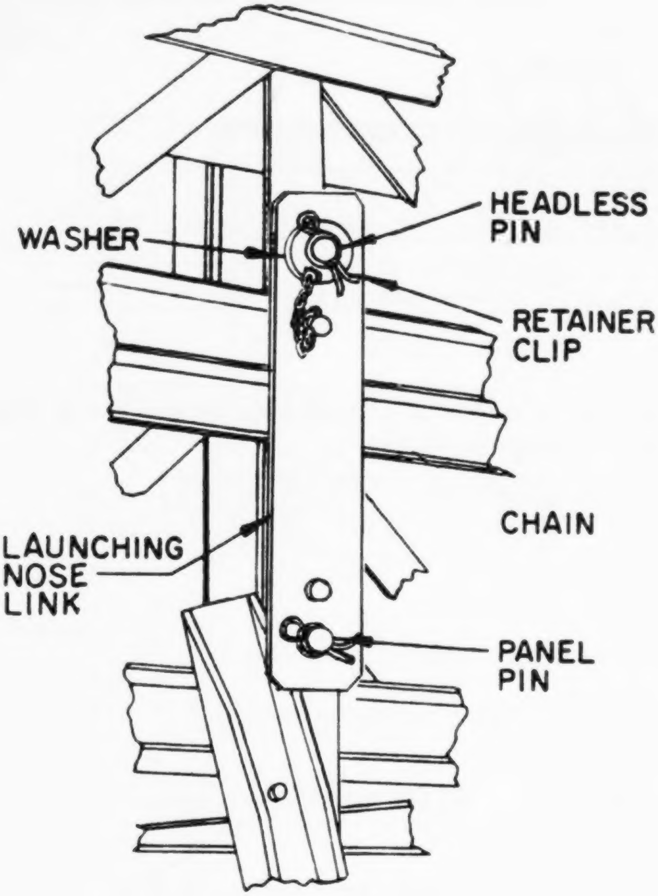
(d) Install flat washer over end of headless pin. Insert retainer clip in end of pin.

(e) Position other link on end of panel and headless pin.

(f) Install flat washer over end of headless pin. Insert retainer clips over ends of headless and panel pin.

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).


HEADLESS PIN
WASHER
RETAINER CLIP
CHAIN
LAUNCHING NOSE LINK
PANEL PIN

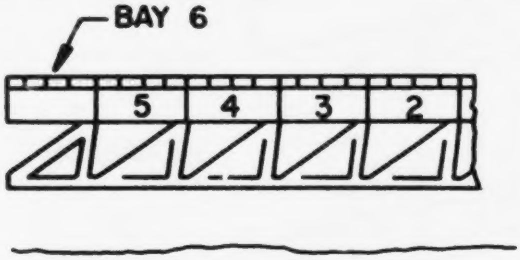
NOTE

Verticals of nose sections should be aligned.

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

21 Assemble bay 6.



NOTE

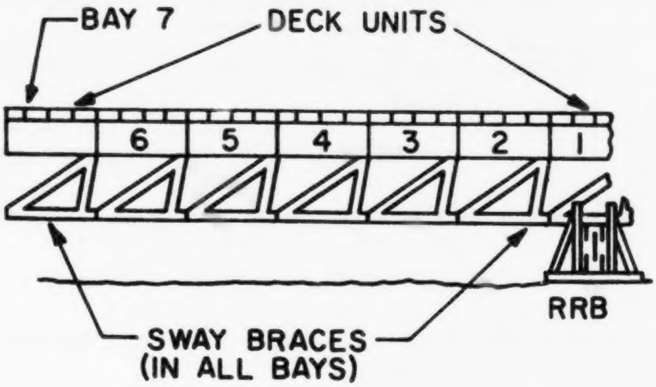
The bottom panel pins at 6p0 (in all bridges) must be attached to ensure that they remain fully seated in pin jaws.

For 2E + 13 thru 2E + 17 bay bridges, PROCEED TO STEP 2.a. 23 .

22 Assemble bay 7.

(a) Place 1 deck unit in the second recess of bays 1 and 7.

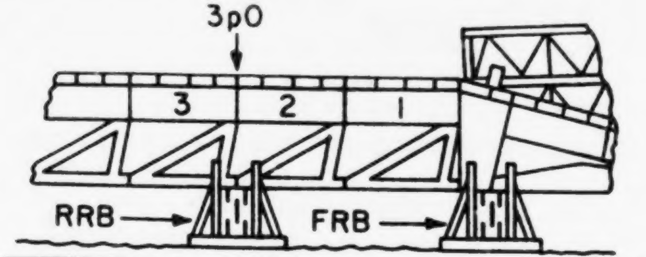
(b) Insure that sway braces have been installed in all bays.

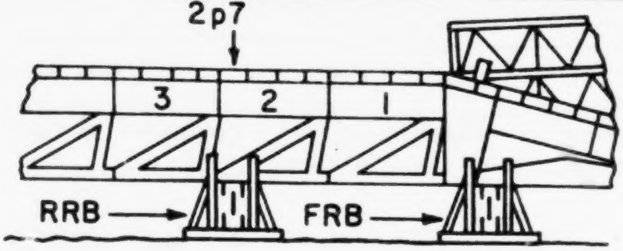

BAY 7
DECK UNITS
6
5
4
3
2
1
RRB
SWAY BRACES
(IN ALL BAYS)

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

23 Boom bridge to panel point shown for bridge being constructed. Lock rollers after boom is is completed, disconnect vehicle and push bar from bridge.





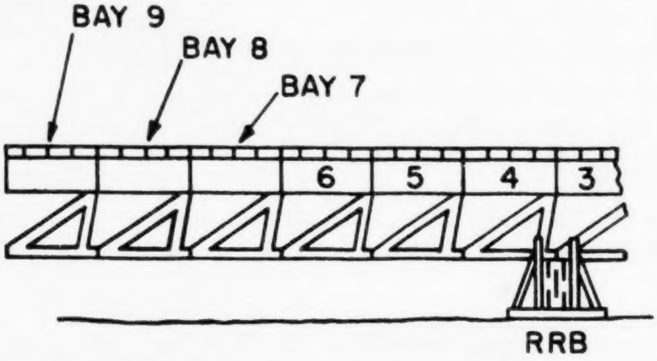
Bridge	Boom To (over RRB)
2E + 13 thru 2E + 15	3p0
2E + 16 thru 2E + 22	2p7

For 2E + 18 thru 2E + 22 bay bridges, PROCEED TO STEP 2.a. 25.

24 Assemble bays 7 thru 9.

(a) Place 1 deck unit in the second recess of bays 1 and 7.

(b) Ensure that sway braces have been installed in all bays.

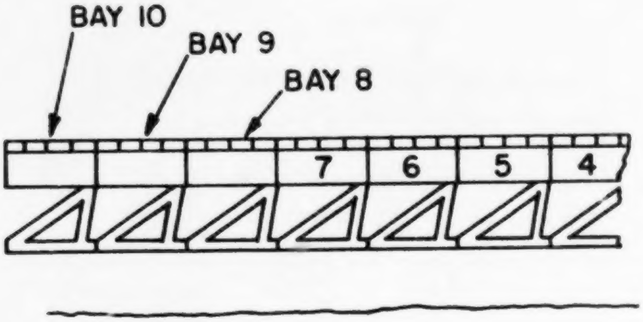


For 2E + 13 thru 2E + 17 bay bridges, PROCEED TO STEP 2.a. 26.

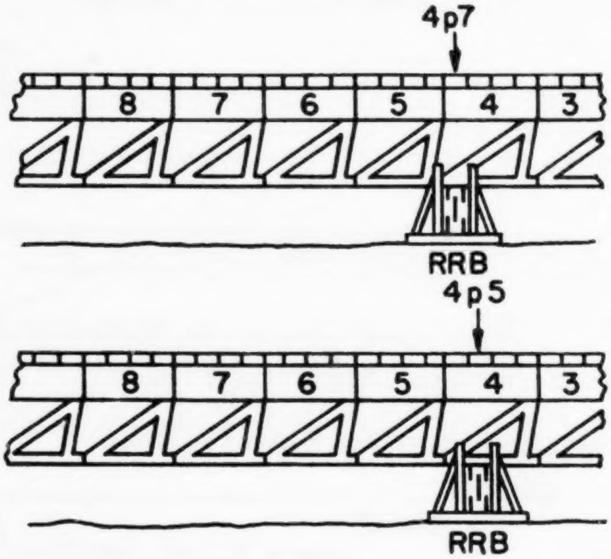
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

25 Assemble bays 8 thru 10.


BAY 10
BAY 9
BAY 8
7
6
5
4

26 Boom bridge to panel point shown for bridge being constructed. Lock rollers after boom is completed, disconnect vehicle and push bar from bridge.


4p7
8
7
6
5
4
3
RRB
4p5
8
7
6
5
4
3
RRB

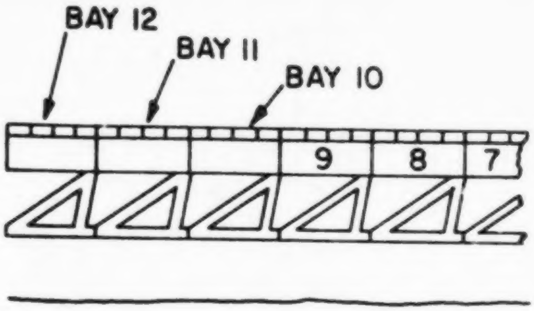
Bridge	Boom To (over RRB)
2E + 13 thru 2E + 15	4p7
2E + 16 thru 2E + 22	4p5

For 2E + 18 thru 2E + 22 bay bridges, PROCEED TO STEP 2.a. 28.

2-11. ASSEMBLY — Continued

Step 2.a. Assembly Procedures (Continued).

27 Assemble bays 10 thru 12.

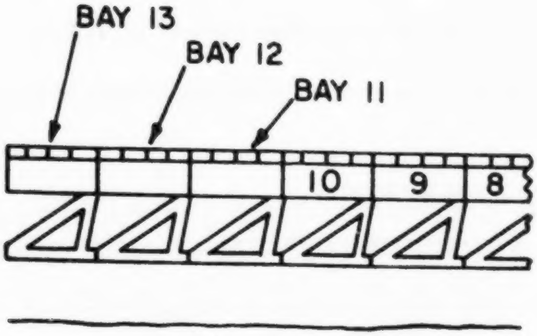

BAY 12
BAY 11
BAY 10
9
8
7

Place 1 deck unit in the second recess of bay 12 for 2E + 13 and 2E + 15 thru 2E + 17 bay bridges.

For 2E + 13 thru 2E + 17 bay bridges, PROCEED TO STEP 2.a. 29.

28 Assemble bays 11 thru 13.

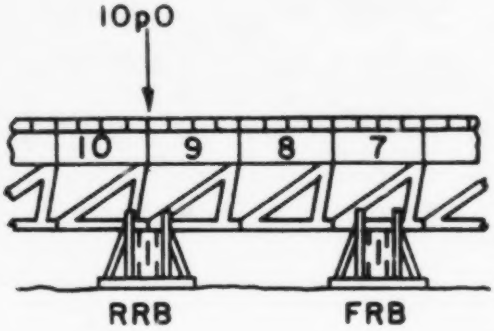
Place 1 deck unit in second recess of bay 12 for 2E + 18 thru 2E + 22 bay bridges.


BAY 13
BAY 12
BAY 11
10
9
8

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

29 Boom bridge to panel point 10p0 (over RRB).



NOTE

During this boom, the front bankseat beam will approach the LRB/CRB. This will occur as panel point 5p7 passes over the RRB. Stop boom at this point and make adjustments in height of the LRB/CRB to receive end of bridge. Continue boom until end of bridge is over LRB/CRB and panel point 10p0 is over RRB. NCOIC will have to watch bridge during boom and make adjustments in roller beam heights. These adjustments are necessary to ensure that at the end of the boom, the LRB/CRB is as high as possible (to ease addition of link reinforcing) and RRB is at a height that will permit easy construction at the rear of bridge.

(a) Boom bridge until the BSB is within 1 ft (0.3 m) of the LRB/CRB. Stop boom. Do not lock rollers, vehicle is holding bridge.

(b) Adjust height of LRB/CRB to receive the end of bridge.

1) Operate hydraulic jacks to raise LRB/CRB as needed to a height slightly below the leading edge of the ETP.

2) DO NOT remove support pins.

3) Unlock rollers in CRB. For LRB, move roller catch by hand to unlock position.

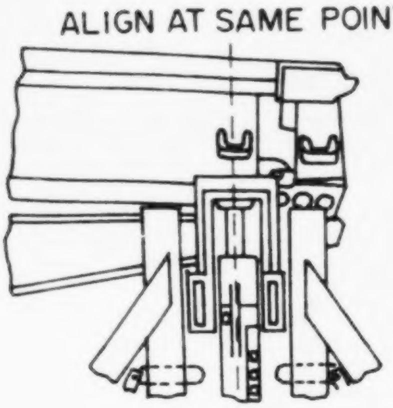
2-11. ASSEMBLY (Continued)

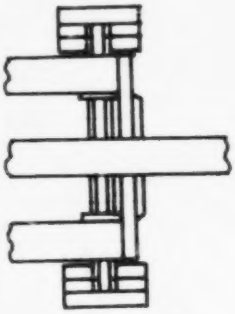
Step 2.a. Assembly Procedures (Continued).

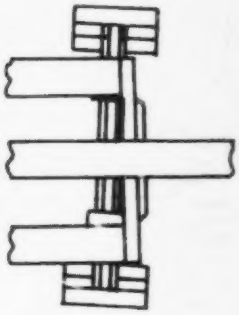
(c) Continue boom slowly watching end of bridge as it passes over LRB/CRB.

1) Ensure that LRB/CRB is approximately level under bridge.

2) Ensure that LRB/CRB is square with the end of bridge.



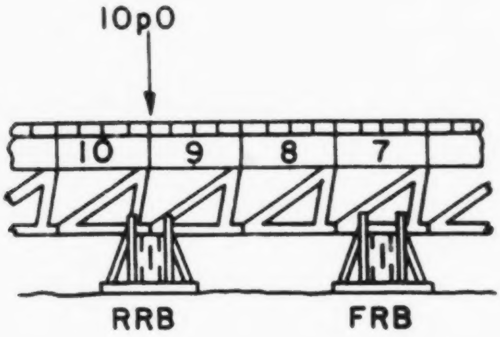

LRB/CRB GOOD


LRB/CRB NO GOOD

NOTE

To ensure that LRB/CRB is square under end of bridge, align LRB/CRB under the exact same point on both sides of bridge.

(d) Stop boom at 10p0 (over RRB). Do not disconnect vehicle. Do not lock rollers, vehicle is holding bridge.

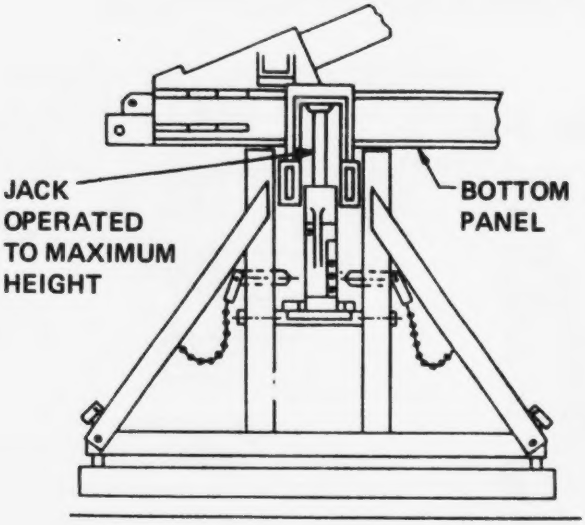


2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(e) Raise LRB/CRB to maximum height and level.

1) Operate jack to its maximum height.

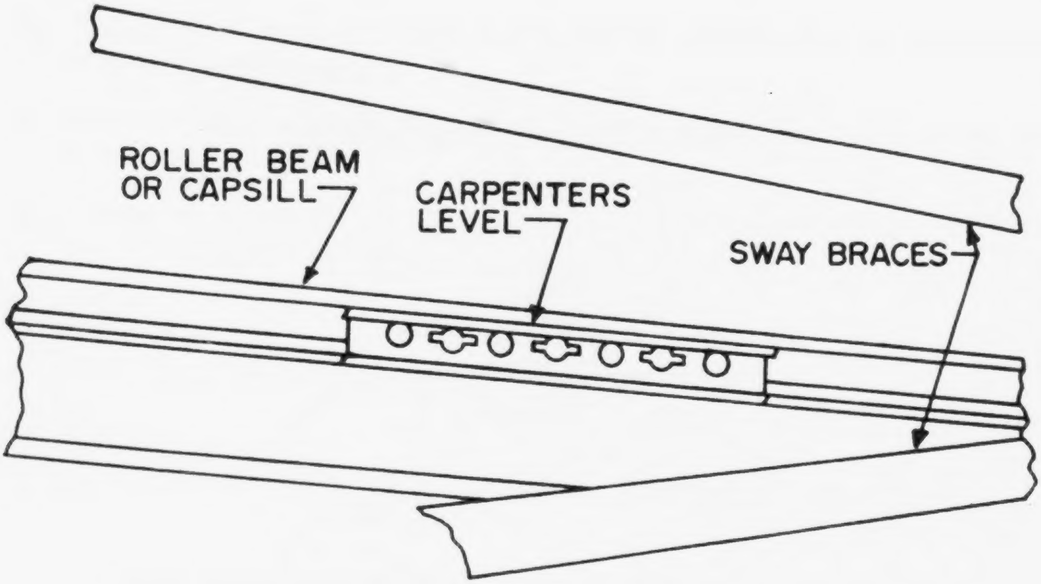


CAUTION

When raising LRB/CRB ensure that the jacks are never placed on a jack seat positioned higher than the 3rd set of support pin holes. Operating a jack to its maximum height will lift the capstill or roller beam out of the adjustable support, if the jack seat is positioned at the 4th hole or higher.

2-11. ASSEMBLY (Continued)

Step 1.a. Assembly Procedure (Continued).


ROLLER BEAM
OR CAPSILL
CARPENTERS
LEVEL
SWAY BRACES

2) Level LRB/CRB at maximum height using a carpenters level.

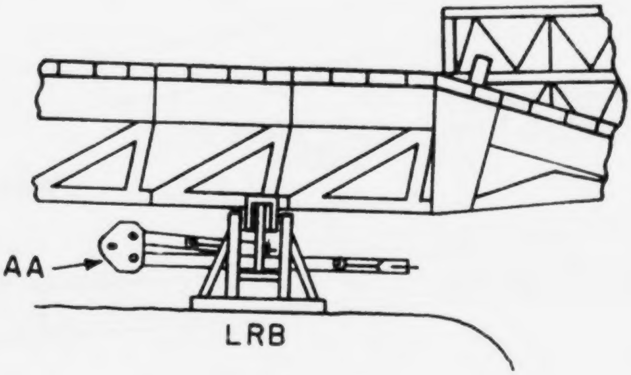
30 Lower FRB. DO NOT remove jacks.

31 Raise or lower RRB as needed to bring the rear of bridge to a height which will make assembly of the next bays as easy as possible.

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

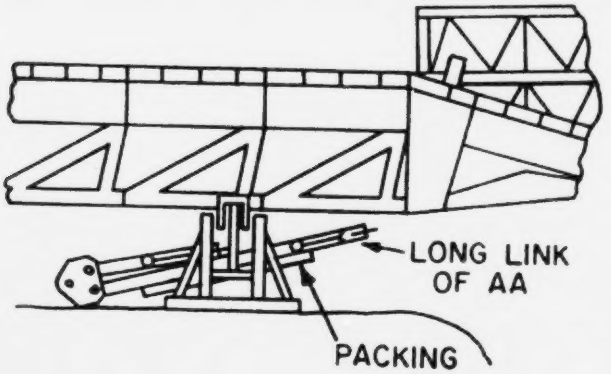
32 Position anchor assembly (AA) under bay 1 with anchor junction block facing away from gap.



NOTE

Lumber packing must be used under the anchor assembly to prevent fouling of assembly with the cross girder. It is easier to place the packing after the assembly is in place, than it is before placing the assembly on the cross girder.

(a) Place a piece of packing on cross girder under anchor assembly. Size of packing is: 3 in x 8 in x 84 in. This packing is used as a skid to prevent fouling of the anchor assembly on the cross girder.



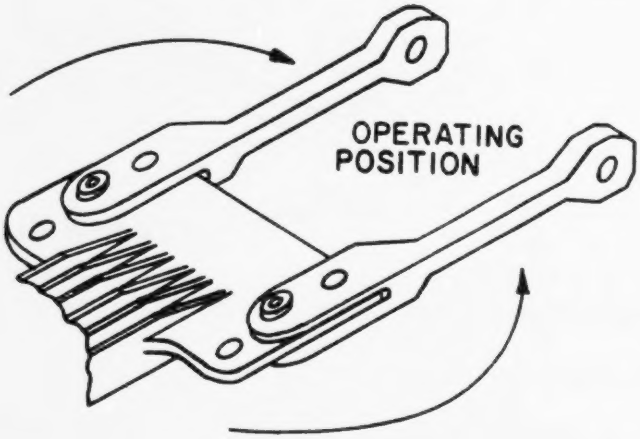
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

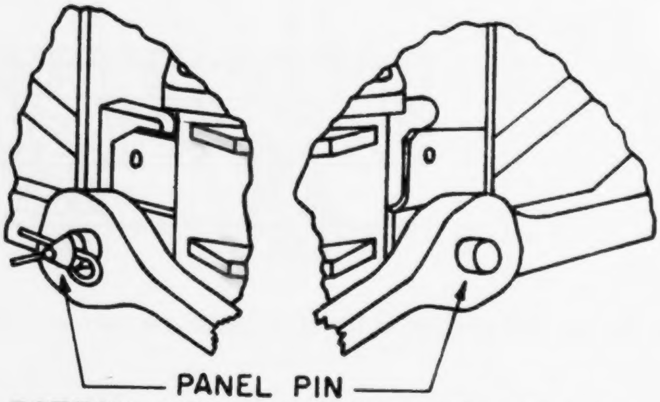
(b) The long link of the anchor assembly is positioned on the skid with the fork end anchors of the long link over the girder.

(c) Move the anchor assembly forward until the fork end anchors can be swung out to the operating position.

(d) Remove the retainer clip and bracing pin from the fork end anchor. Swing fork end anchors out to the operating position.



(e) Fit fork end anchors of the long link over bottom panel pin at panel point 1p0. The retainer clip through the panel pin must be removed, and then replaced once the end anchor is in place.



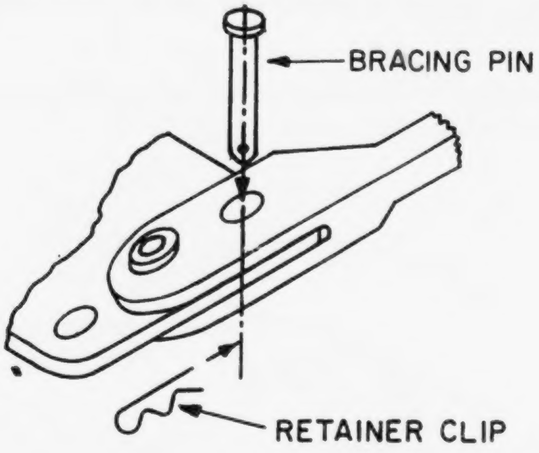
BOTTOM AND JUNCTION PANEL AT IpO

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(f) Lock the fork end anchors in operating position with bracing pin.

(g) Put retainer clip through the end of bracing pin.

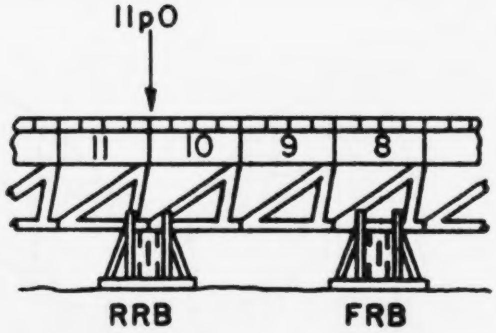

BRACING PIN
RETAINER CLIP

33 Boom bridge to 11p0 over RRB.

(a) Lock all rollers.

(b) Disconnect vehicle and push bar.

(c) Remove packing from cross girder.

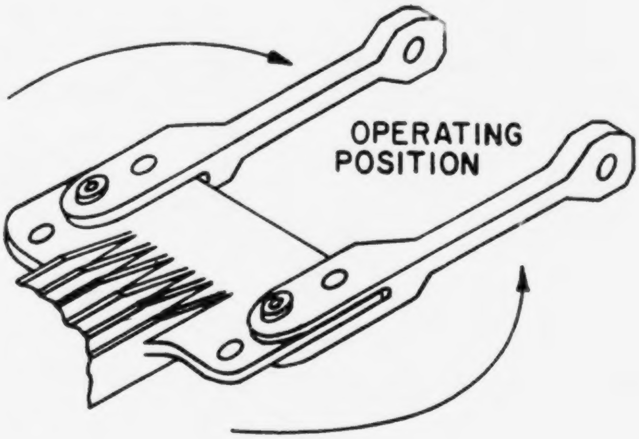

11p0
11
10
9
8
RRB
FRB

34 Connect the fork end anchors of the short link to the bottom panel pin at panel point 2p0.

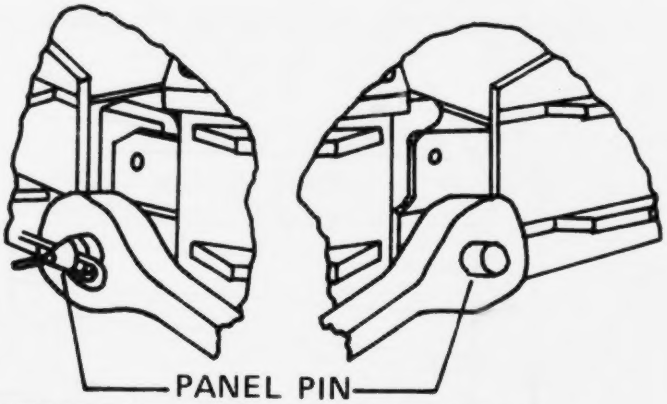
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(a) Remove the retainer clip and bracing pin from the fork end anchor. Swing the fork end anchors out to the operating position.



(b) Fit the fork end anchors of the short link over the bottom panel pin at panel point 2p0. The retainer clip through the panel pin must be removed, and replaced once the end anchor is in place.



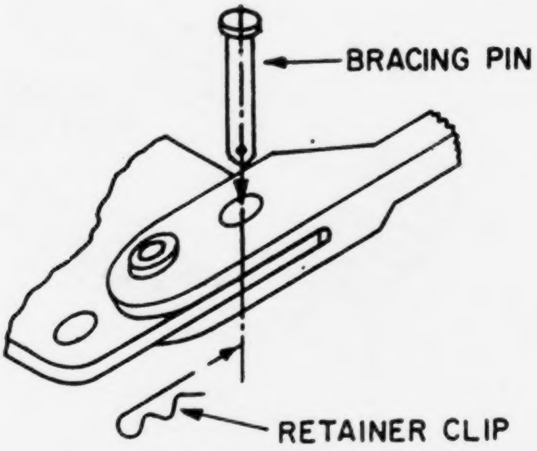
BOTTOM AND JUNCTION PANEL AT 2pO

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

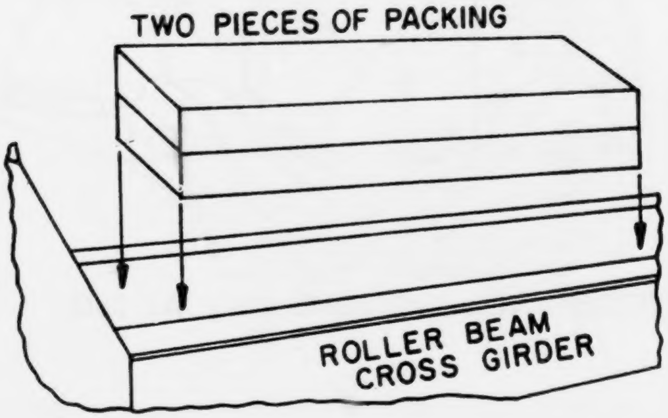
(c) Lock the fork end anchors in operating position with bracing pin.

(d) Put retainer clip through the end of panel pin.


BRACING PIN
RETAINER CLIP

35 Connect long reinforcing link to anchor junction block of anchor assembly.

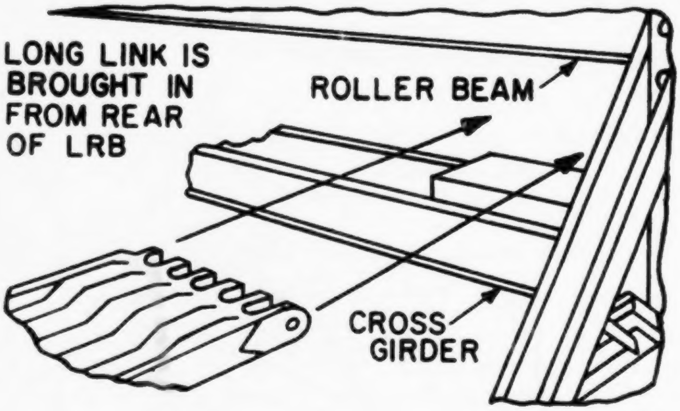
(a) Stack two pieces of packing on each side of roller beam cross girder. Packing used is 3 in x 8 in x 36 in.


TWO PIECES OF PACKING
ROLLER BEAM CROSS GIRDER

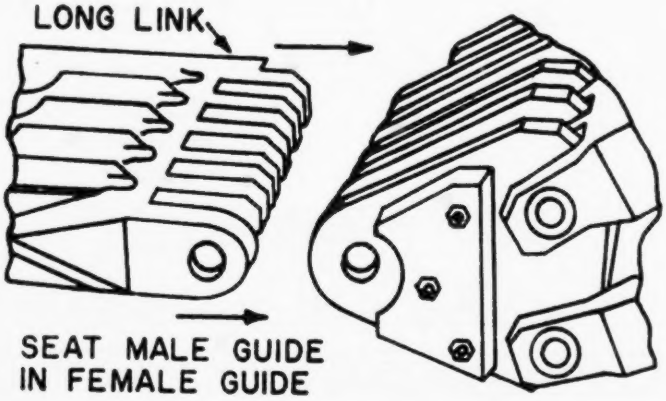
(b) The long link is brought in behind the LRB/CRB and positioned under the roller beam and over the cross girder.

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).


LONG LINK IS BROUGHT IN FROM REAR OF LRB
ROLLER BEAM
CROSS GIRDER

(c) Align pin holes of link with holes of anchor junction block. Use male and female guides to align pin jaws.

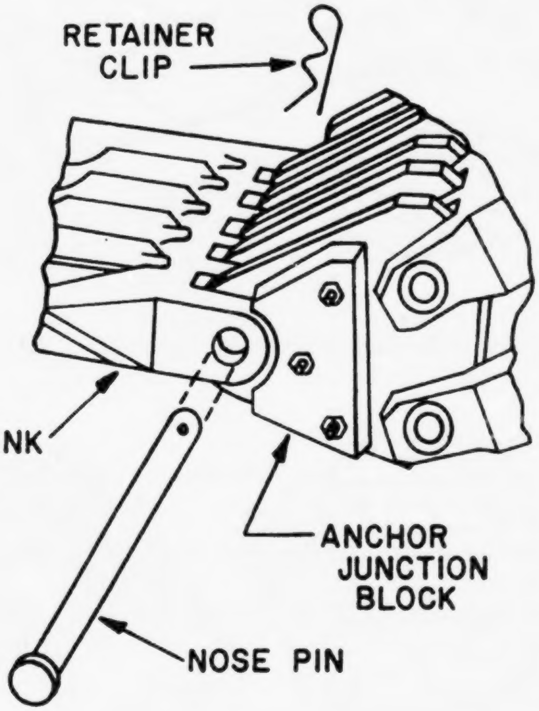

LONG LINK
SEAT MALE GUIDE IN FEMALE GUIDE

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(d) Insert nose pin through holes in link and anchor junction block.

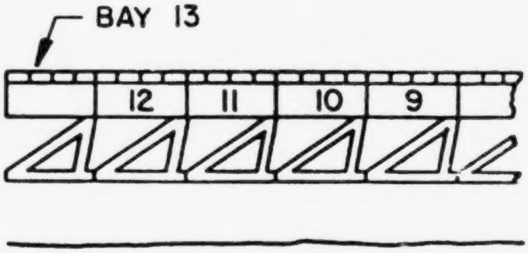
(e) Put retainer clip through the end of nose pin.


RETAINER CLIP
LINK
ANCHOR JUNCTION BLOCK
NOSE PIN

For 2E + 18 thru 2E + 22 bay bridges, PROCEED TO STEP 2.a. 37 .

36 Pin bay 13 to end of bay 12.

Place 1 deck unit in second recess of bay 13 for 2E + 14 bay bridge only.


BAY 13
12
11
10
9

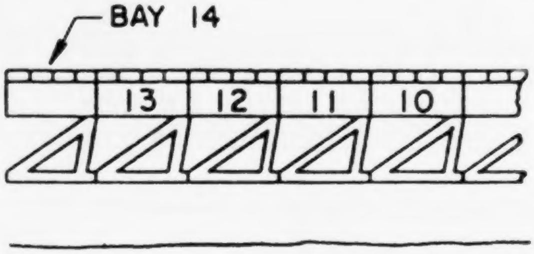
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

For 2E + 13 bay bridge, PROCEED TO STEP 2.a. 41 .

37 Pin bay 14 to end of bay 13.

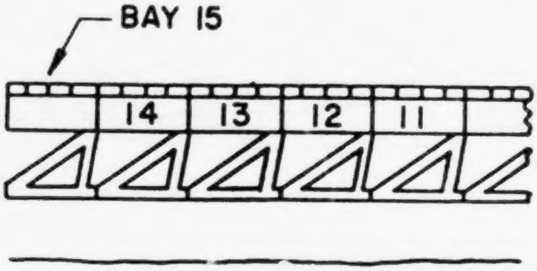
Place 1 deck unit in the second recess of bay 14 for 2E + 15 bay bridge only.



For 2E + 14 bay bridge, PROCEED TO STEP 2.a. 41 .

38 Pin bay 15 to end of bay 14.

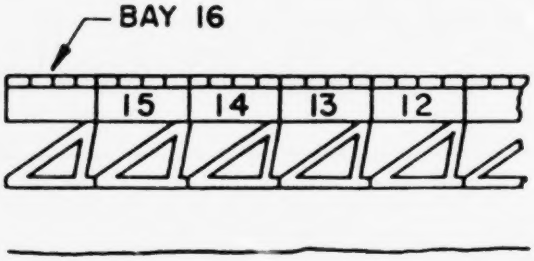
Place 1 deck unit in the second recess of bay 15 for 2E + 16 bay bridge only.



For 2E + 15 bay bridge, PROCEED TO STEP 2.a. 41 .

39 Pin bay 16 to end of bay 15.

Place 1 deck unit in the second recess of bay 16 for 2E + 17 bay bridge only.

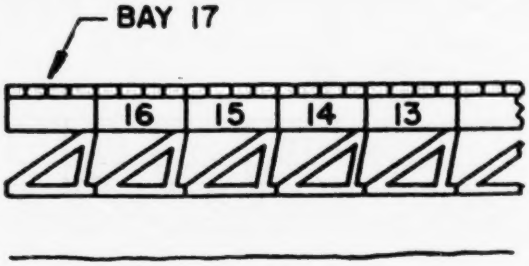


2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

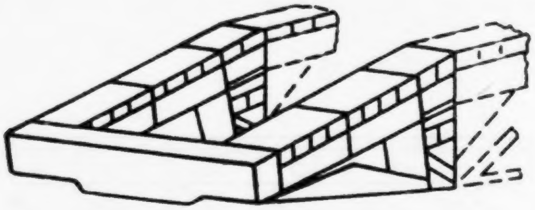
For 2E + 16 bay bridge, PROCEED TO STEP 2.a. 41 .

40 Pin bay 17 to end of bay 16. Place 1 deck unit in second recess of bay 17 for 2E + 18 and 2E + 20 thru 2E + 22 bay bridges.



For 2E + 18 thru 2E + 22 bay bridges, PROCEED TO STEP 2.a. 42 .

41 Complete the end of bridge for 2E + 13 thru 2E + 17 bay bridges.



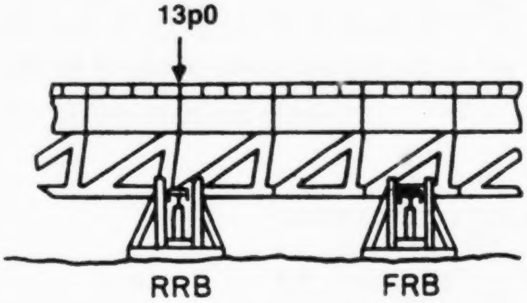
For 2E + 13 thru bay bridges, PROCEED TO STEP 2.a. 62 .

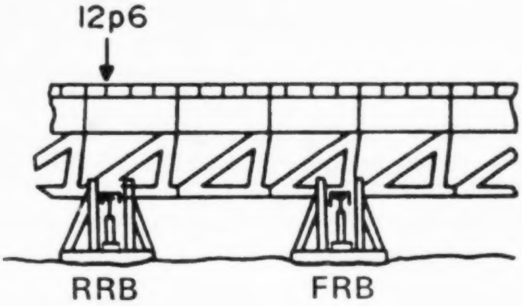
42 Boom bridge to panel point given below for bridge being constructed. Lock rollers after boom is completed.

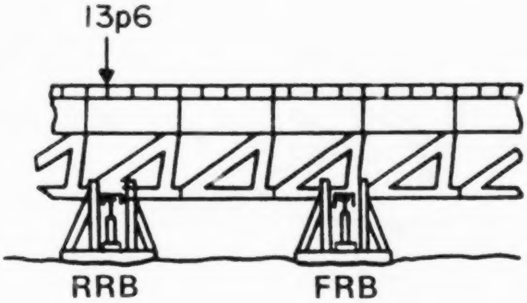
Bridge Length	Boom To
2E + 14	13p6
2E + 15	13p0
2E + 16 and 2E + 17	12p6
2E + 18 thru 2E + 22	13p0

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

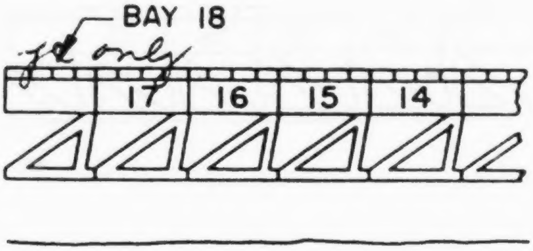

13p0
RRB
FRB


12p6
RRB
FRB


13p6
RRB
FRB

For 2E + 14 thru 2E + 17 bay bridges, PROCEED TO STEP 2.a. 49 .

43. Pin bay 18 to end of bay 17. Place 1 deck unit in the second recess of bay 18 for 2E + 19 bay bridge only.

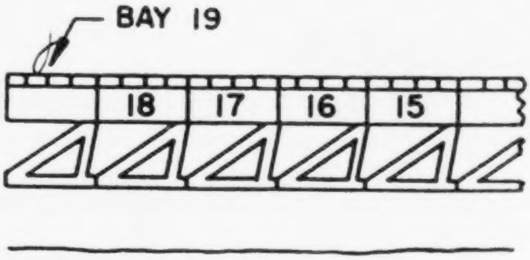

BAY 18
fd only
17
16
15
14

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

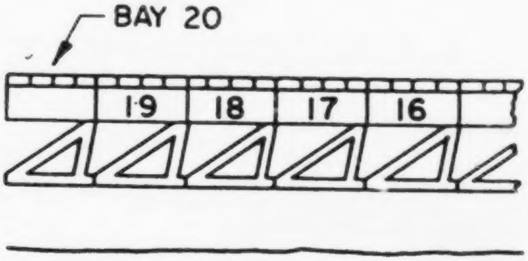
For 2E + 18 bay bridge, PROCEED TO STEP 2.a. 48 .

44. Pin bay 19 to end of bay 18. Place 1 deck unit in the second recess of bay 19 for 2E + 20 bay bridge only.



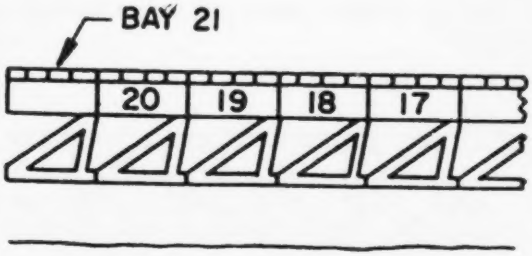
For 2E + 19 bay bridge, PROCEED TO STEP 2.a. 49 .

45. Pin bay 20 to end of bay 19. Place 1 deck unit in the second recess of bay 20 for 2E + 21 bay bridge only.



For 2E + 20 bay bridge, PROCEED TO STEP 2.a. 49 .

46. Pin bay 21 to end of bay 20. Place one deck unit in the second recess of bay 21 for 2E + 22 bay bridge only.

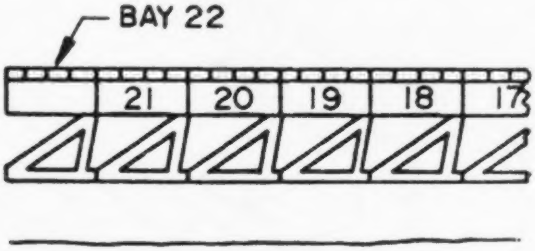


2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

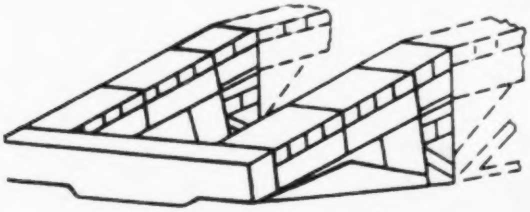
For 2E + 21 bay bridge, PROCEED TO STEP 2.a. 49 .

47 Pin bay 22 to end of bay 21.



For 2E + 22 bay bridge, PROCEED TO STEP 2.a. 49 .

48 Complete the end of bridge for 2E + 18 bay bridge.

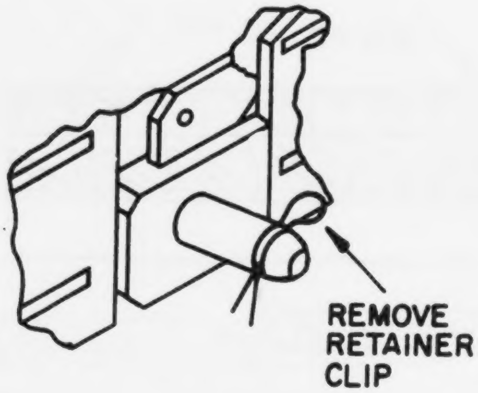


2-11. ASSEMBLY (Continued)

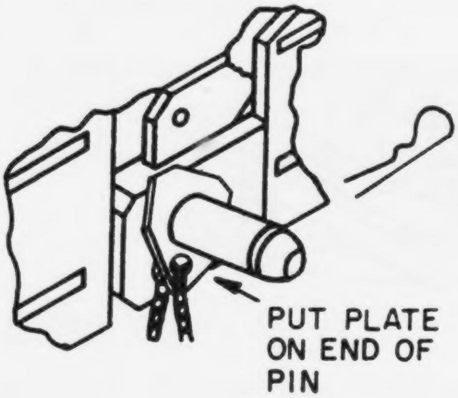
Step 2.a. Assembly Procedures (Continued).

49 Attach light tackle to reinforcing link and bridge at panel point 4p7.

(a) Remove retainer clip from panel pin in bottom panel.


REMOVE RETAINER CLIP

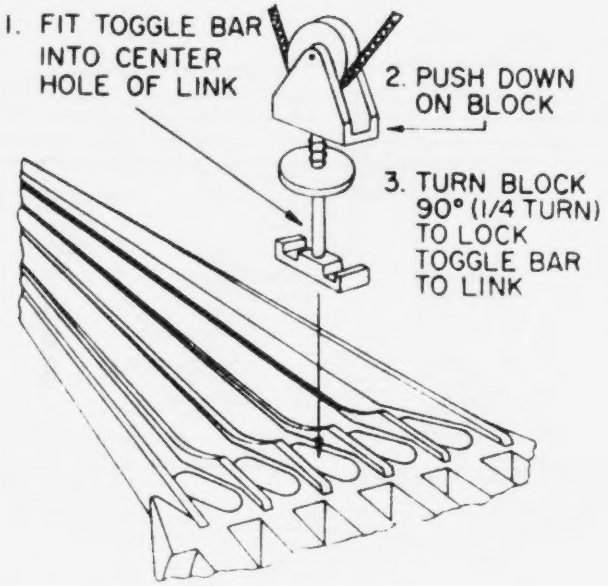
(b) Fit plate of tackle over end of pin, and put retainer clip in end of panel pin.


PUT PLATE ON END OF PIN

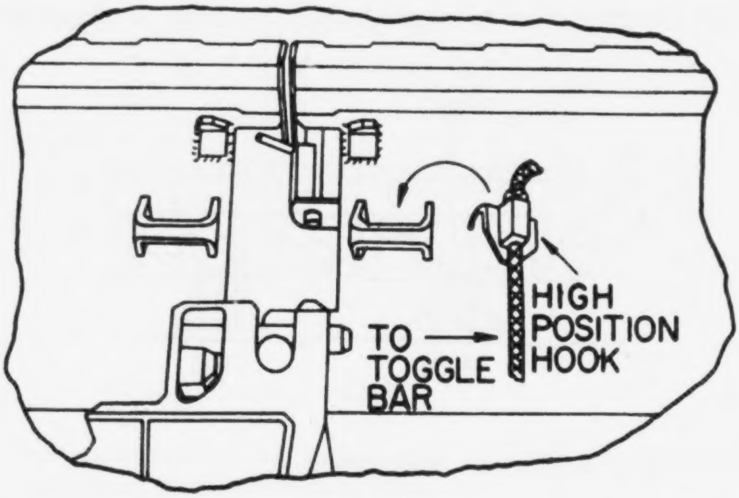
(c) Fit toggle bar of tackle into center hole of link.

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).


1. FIT TOGGLE BAR INTO CENTER HOLE OF LINK
2. PUSH DOWN ON BLOCK
3. TURN BLOCK 90° (1/4 TURN) TO LOCK TOGGLE BAR TO LINK

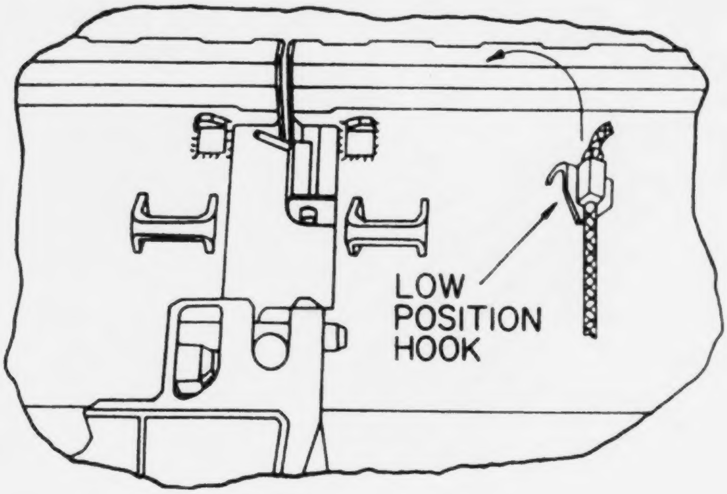
(d) Place high position hook in carrying bar bracket of top panel.


HIGH POSITION HOOK
TO TOGGLE BAR

2-11. ASSEMBLY (Continued)

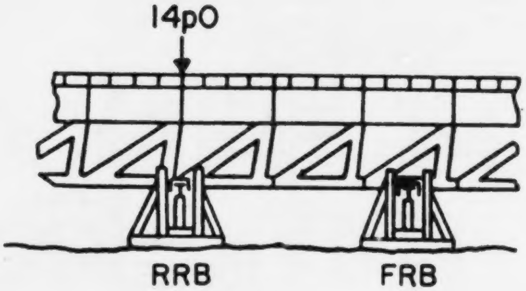
Step 2.a. Assembly Procedures (Continued).

(e) Place low position hook in deck rail of top panel.



For 2E + 14 bay bridge, PROCEED TO STEP 2.a. 62 .

50. Boom bridge to panel point 14p0. Lock rollers after boom is completed.



51. Attach post tensioning assembly under bay 5.

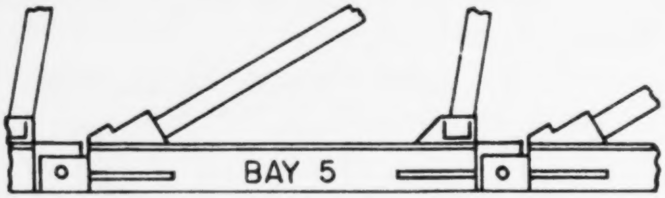
NOTE

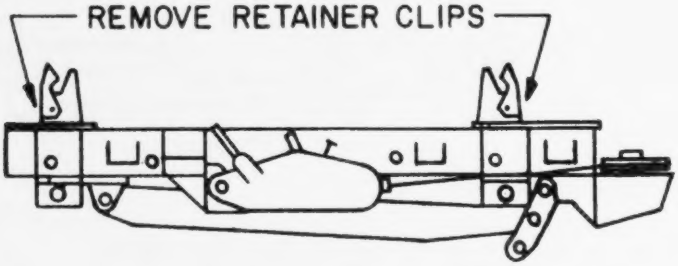
Post tensioning assemblies can be right or left handed. Ensure that correct assembly is used. Pulley end of assembly must be toward closest bankseat beam with cable puller rigged on outside of bridge.

(a) Position post tensioning assembly under bay 5. Remove retainer clips from upper jaws of assembly, these clips will be put back in when jaws lock around panel pins.

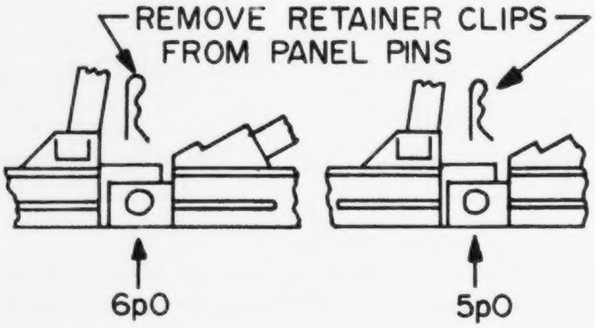
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).




REMOVE RETAINER CLIPS

(b) Remove retainer clips from panel pins at 5p0 and 6p0 (bottom panel pins). These clips will be put back on after upper jaws are secured to panel pins.

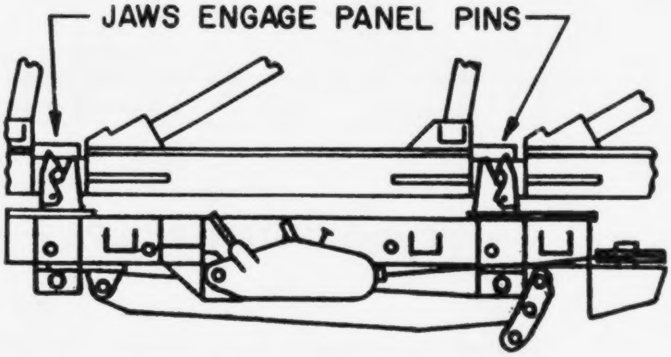

REMOVE RETAINER CLIPS FROM PANEL PINS
6p0
5p0

NOTE

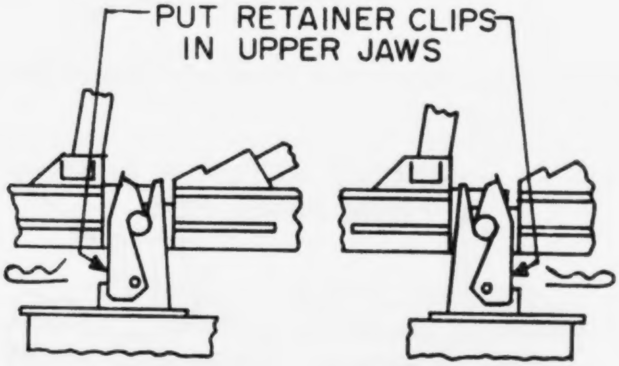
Ensure that panel pins are fully seated. If not, shoulder of pin will interfere with connection of post tensioning assembly.

2-11. ASSEMBLY (Continued)

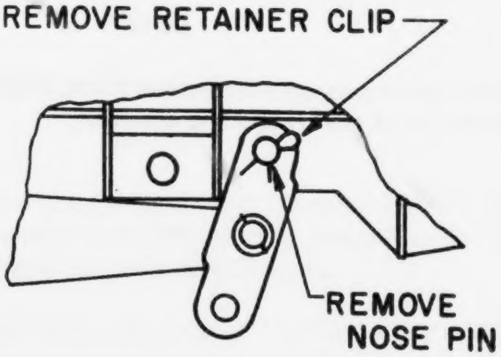
(c) Lift post tensioning assembly until upper jaws engage and lock around ends of panel pins in bottom panel.


JAWS ENGAGE PANEL PINS

(d) Put retainer clip in each upper jaw.

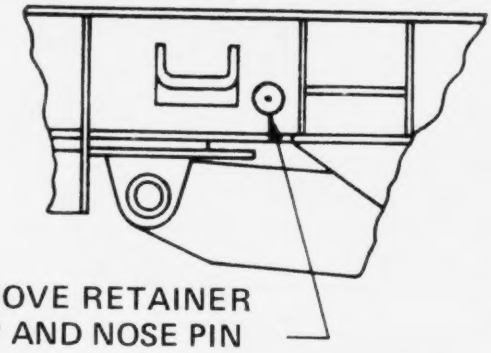

PUT RETAINER CLIPS
IN UPPER JAWS

(e) Lift post to remove tension from nose pin. Remove retainer clip and nose pin from frame and link connecting block. Place this pin in the bottom panel of bay 5.

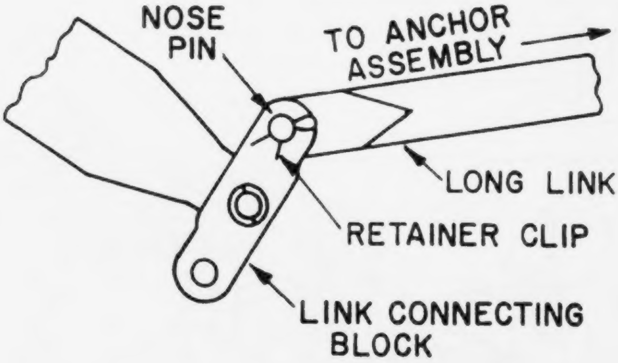

REMOVE RETAINER CLIP
REMOVE
NOSE PIN

2-11. ASSEMBLY (Continued)

(f) Remove retainer clip and nose pin securing sliding block in frame. Use this pin to secure block once post has been tensioned. Until needed this pin is stored in bottom panel of bay 5.

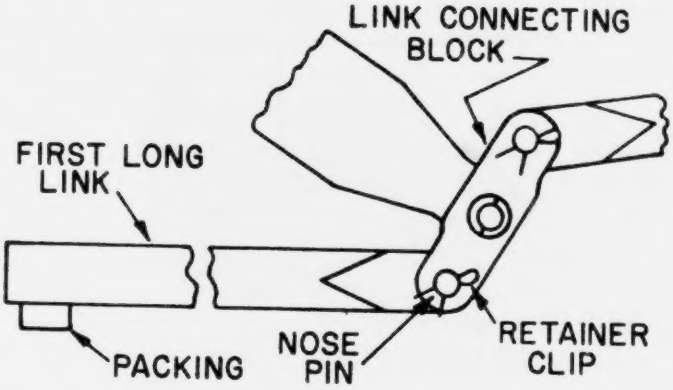

REMOVE RETAINER
CLIP AND NOSE PIN

(g) Pin long link from anchor assembly to link connecting block with nose pin. Secure with retainer clip.

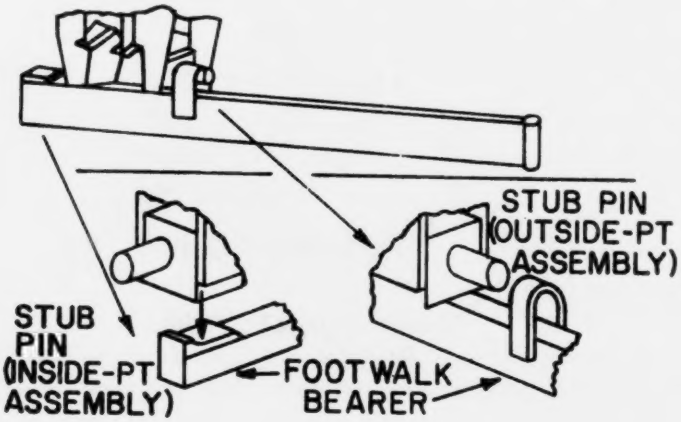

NOSE PIN
TO ANCHOR ASSEMBLY
LONG LINK
RETAINER CLIP
LINK CONNECTING BLOCK

Step 2.a. Assembly Procedures (Continued).

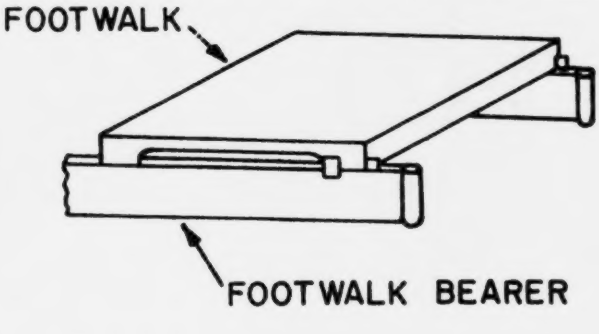
(h) Pin first long link to post tensioning assembly link connecting block with nose pin. Secure with retainer clip. Place a piece of packing under rear of long link. This will make connection of next link easier.


LINK CONNECTING BLOCK
FIRST LONG LINK
PACKING
NOSE PIN
RETAINER CLIP

(i) Fit footwalk bearers to stub pins on post tensioning assembly.


STUB PIN (OUTSIDE-PT ASSEMBLY)
STUB PIN (INSIDE-PT ASSEMBLY)
FOOTWALK BEARER

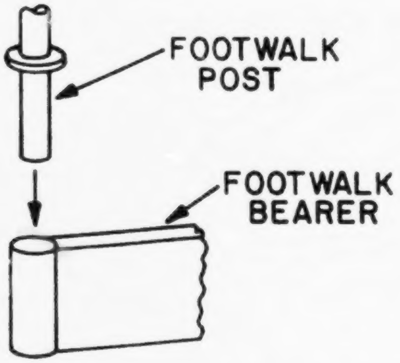
(j) Place footwalk on bearers. Ensure that footwalk is fully seated on bearer.


FOOTWALK
FOOTWALK BEARER

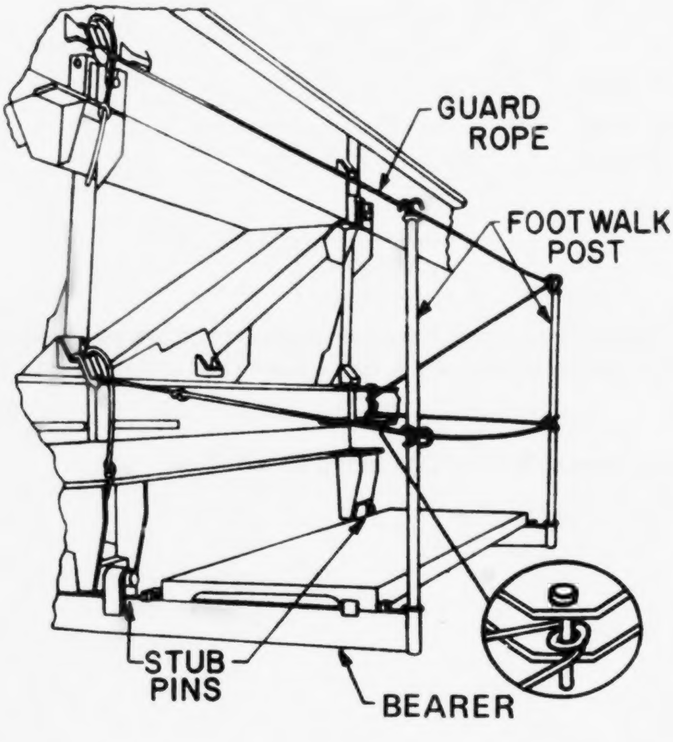
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(k) Put footwalk posts in holes of footwalk bearers.


FOOTWALK POST
FOOTWALK BEARER

(l) Put hook of guard rope in carrying bar bracket of bay 6 bottom panel. Feed rope through bottom hooks of both posts. Form a bight in rope at sway brace bracket of bottom panel 5 and secure bight in bracket with bracing pin. Feed rope through top hooks of posts. Put hook of guard rope in carrying bar bracket of bay 6 top panel.

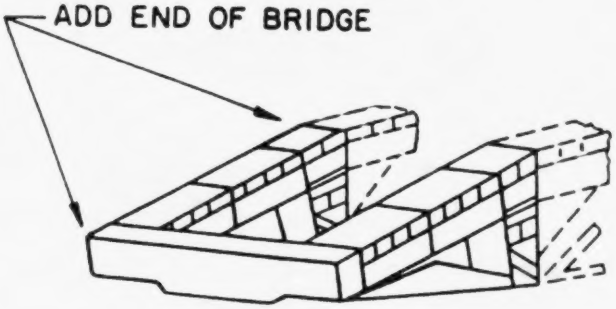

GUARD ROPE
FOOTWALK POST
STUB PINS
BEARER

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

For 2E + 15 thru 2E + 18 and 2E + 21 and 2E + 22 bay bridges, PROCEED TO STEP 2.a. 54 .

52 Complete the end of bridge for 2E + 19 and 2E + 20 bay bridges.



NOTE

Counterweight deck units are required on 2E + 19 thru 2E + 22 bay bridges only. Counterweights are used in one or two stages.

Bridge Length 2E + No. of Bays	First Stage		Second Stage	
	Bridge At Boom Position	And The End Of Bridge Has Been Added	Bridge At Boom Position	Add
19	14p0 over RRB	8D	—	—
20	14p0 over RRB	20D + 6C	—	—

CAUTION

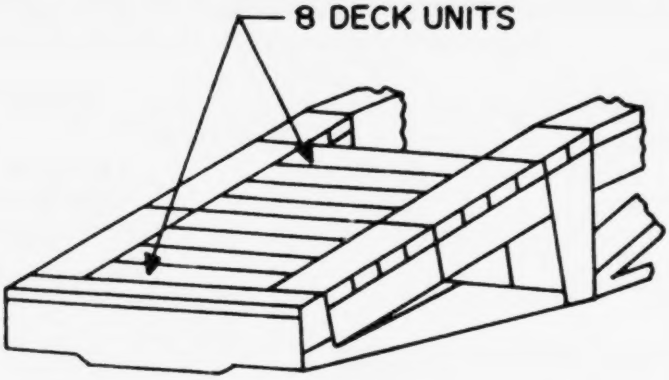
Do not add counterweight of both stages in one stage unless instructed to do so. Failure to follow instructions can cause rear roller beam (RRB) to collapse.

53. Add first stage counterweight for bridge being constructed.

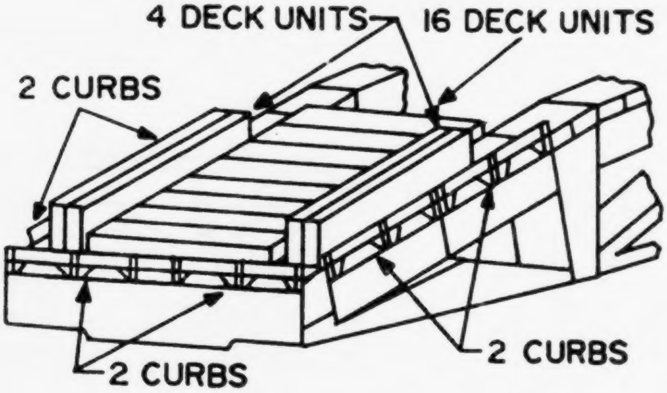
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(a) For 2E + 19 bay, place 8 deck units on end of bridge as shown.


8 DECK UNITS

(b) For 2E + 20 bay, place 20 deck units and 6 curbs on end of bridge as shown.


4 DECK UNITS
16 DECK UNITS
2 CURBS
2 CURBS
2 CURBS

54. Connect additional links to first link as indicated for bridge being constructed.

Bridge Length	No. of Links	Bridge Length	No. of Links
2E + 15	1 short 1 long	2E + 19	1 long 1 short
2E + 16	2 long	2E + 20	2 long
2E + 17	1 long 1 short	2E + 21	2 long
2E + 18	2 long	2E + 22	2 long

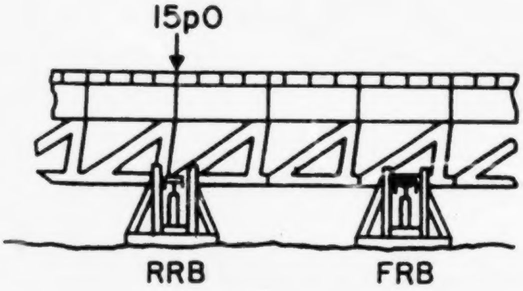
2-11. ASSEMBLY (Continued)

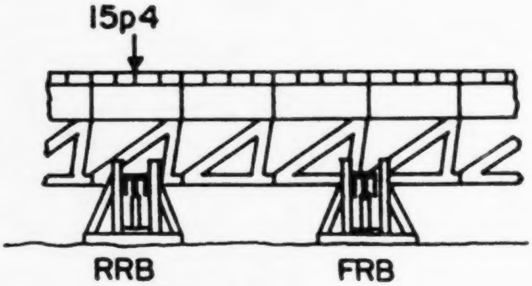
Step 2.a. Assembly Procedures (Continued).

For 2E + 15 thru 2E + 17 bay bridges, PROCEED TO STEP 2.a. 62.

55. Boom bridge to panel point given for bridge being constructed. Lock rollers after boom is completed.

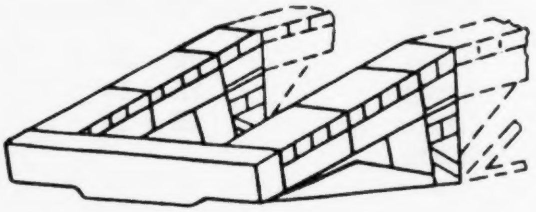
BRIDGE	BOOM TO
2E + 18 thru 2E + 21 bay	15p0 (over RRB)
2E + 22 bay	15p4 (over RRB)





For 2E + 18 thru 2E + 20 and 22 bay bridges, PROCEED TO STEP 2.a. 58.

56. Complete end of bridge for 2E + 21 bay bridge.



2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

NOTE

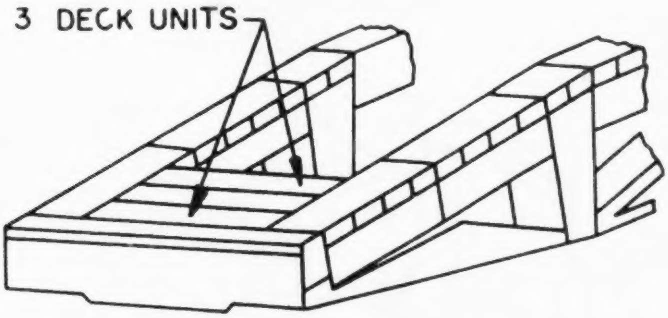
Counterweight deck units are required on 2E + 19 thru 2E + 22 bay bridges only. Counterweights are used in one or two stages.

Bridge Length 2E + No. of Bays	First Stage Bridge At Boom Position	And The End Of Bridge Has Been Added	Second Stage Bridge At Boom Position	Add
21	15p0 over RRB	3D	15p0 over LRB/CRB	27D + 6C

CAUTION

Do not add counterweight of both stages in one stage unless instructed to do so. Failure to follow instructions can cause rear roller beam (RRB) to collapse.

57. Add 3D counterweight to bridge as shown.

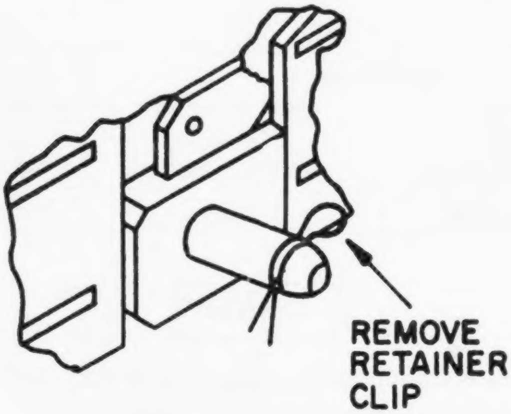


58. Attach light tackle to reinforcing link and bridge at panel point 6p7.

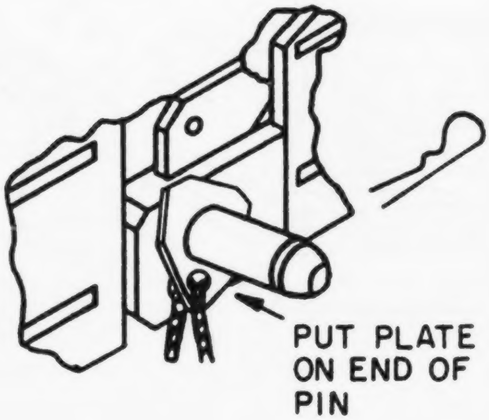
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(a) Remove retainer clip from panel pin in bottom panel.


REMOVE
RETAINER
CLIP

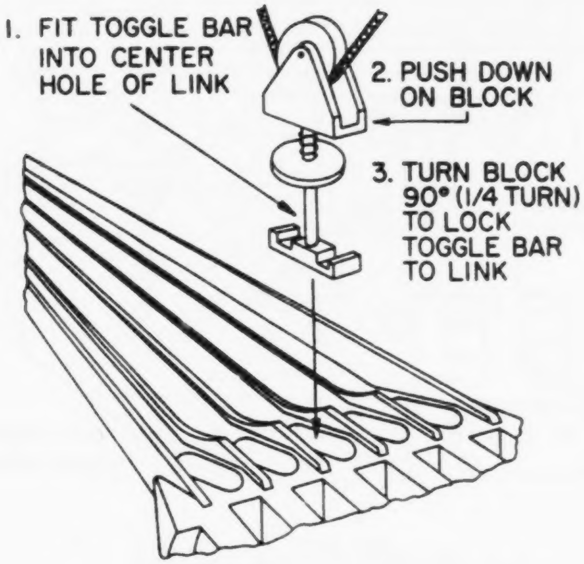
(b) Fit plate of tackle over end of pin, and put retainer clip in end of panel pin.


PUT PLATE
ON END OF
PIN

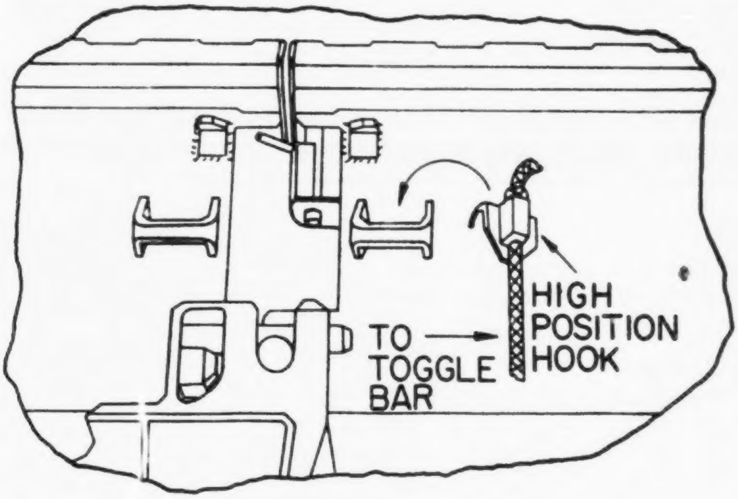
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(c) Fit toggle bar of tackle into center hole of link.


1. FIT TOGGLE BAR INTO CENTER HOLE OF LINK
2. PUSH DOWN ON BLOCK
3. TURN BLOCK 90° (1/4 TURN) TO LOCK TOGGLE BAR TO LINK

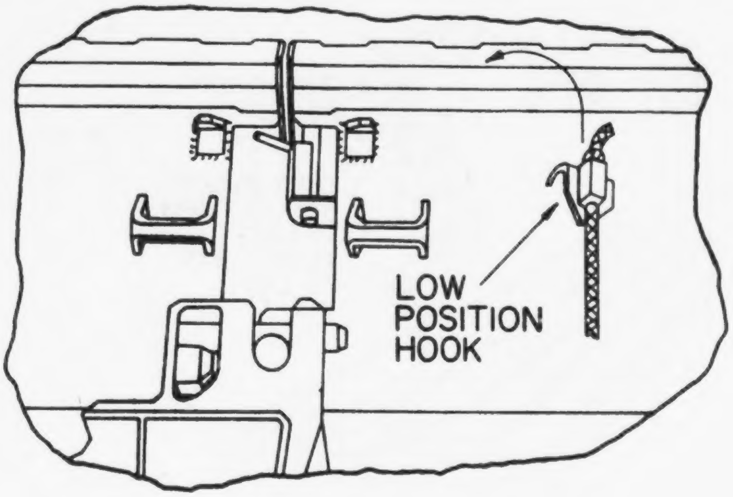
(d) Place high position hook in carrying bar bracket.


TO TOGGLE BAR
HIGH POSITION HOOK

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(e) Place low position hook in deck rail of the same top panel.



For 2E + 18 and 2E + 20 bay bridges, PROCEED TO STEP 2.a. 62.

59. Attach additional links to link chain as indicated for bridge being constructed.

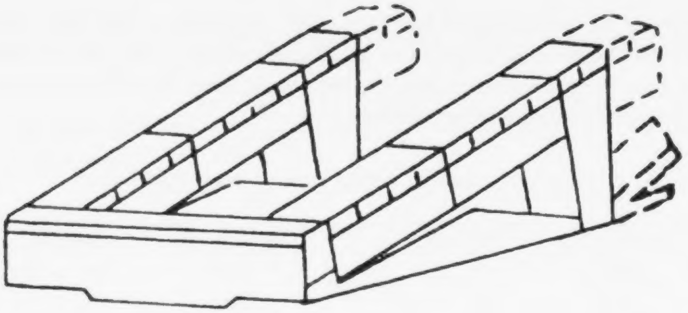
Bridge Length	Attach Link
2E + 19	1 long
2E + 21	1 short
2E + 22	1 long

For 2E + 19 and 2E + 21 bay bridges, PROCEED TO STEP 2.a. 62.

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

60. Complete end of bridge for 2E + 22 bay bridge.



NOTE

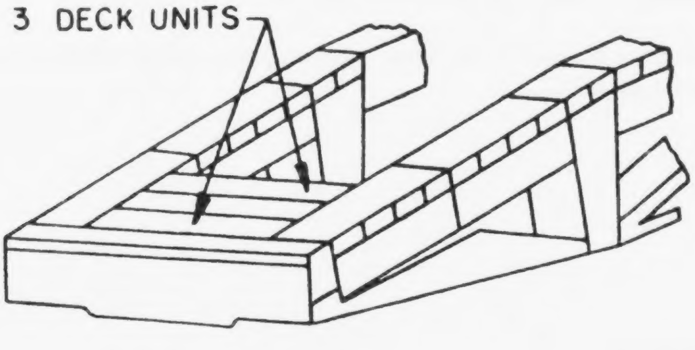
Counterweight deck units are required on 2E + 19 thru 2E + 22 bay bridges only. Counterweights are used in one or two stages.

Bridge Length 2E + No. of Bays	First Stage		Second Stage	
	Bridge At Boom Position	And The End Of Bridge Has Been Added	Bridge At Boom Position	Add
22	15p4 over RRB	3D	15p0 over LRB/CRB	37D + 6C

CAUTION

Do not add counterweight of both stages in one stage unless instructed to do so. Failure to follow instructions can cause rear roller beam (RRB) to collapse.

61. Add 3D counterweight to bridge as shown.



2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

NOTE

The launch of all bridges will be done with a vehicle. Once this vehicle is connected to the bridge, it will not be disconnected until the far bank end of bridge has been jacked down. During launching, reinforcing links, light and anti-flutter tackles will be added.

62. Launch bridge to panel point given for bridge being constructed.

Bridge	Launch To	Bridge	Launch To	Bridge	Launch To
2E + 13	6p0	2E + 17	7p6	2E + 20	9p6
2E + 14	6p4	2E + 18	8p0	2E + 21	9p4
2E + 15	7p0	2E + 19	8p5	2E + 22	10p0
2E + 16	7p2				

(a) Pin long push bar to center bracket of bankseat beam with nose pin or to push bar cross girder with bracing pin. Secure nose or bracing pin with retainer clip.

(b) Move vehicle into position near rear of bridge. Ensure that vehicle is in a straight line with the bridge and centered over the centerline.

(c) Pin push bar to adapter with bracing pin and secure pin with retainer clip.

(d) Launch bridge to panel point given above.

(e) Do not lock rollers. The vehicle is used to hold the bridge in place.

63 Set up landing roller pedestal (LRP) MK2 on far bank.

(a) The right and left bridge crews raise the rear of bridge by hand to put tip of nose firmly on the far bank. Hold rear of bridge steady.

NOTE

Packing may be needed under the LRP if ground is soft or uneven. Packing (2 pieces) is needed to reposition the LRP.

(b) Far bank crew crosses to far bank, carrying packing and carrying bars. Amount of packing is determined by NCOIC.

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

NOTE

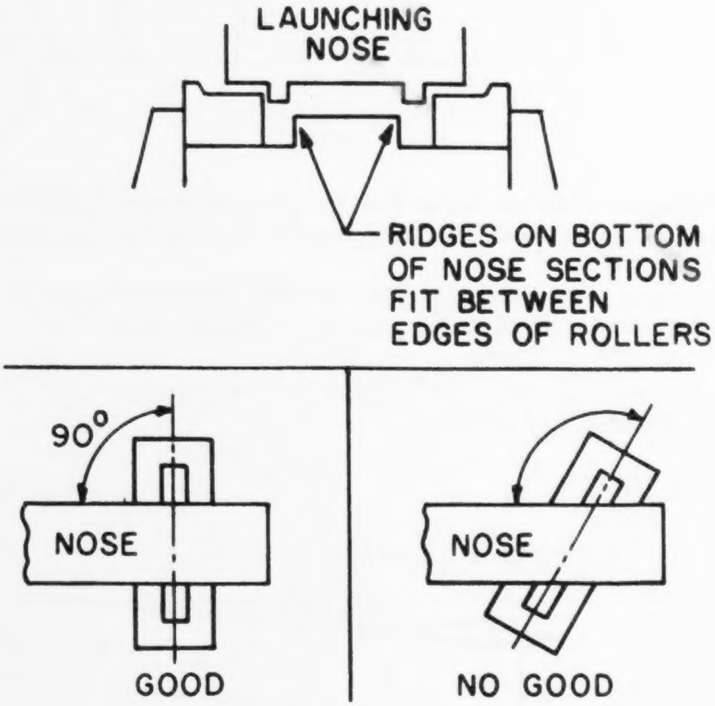
Spare LRP (if used) is placed to one side of site 12 ft (3.7 m) from edge of gap.

(c) Remove LRP from tip of launching nose. As LRP is removed, the rear of bridge is lowered back onto roller beams.

(d) Place fully extended jack (20 ton) in base of LRP, lower jack hood onto head of jack.

NOTE

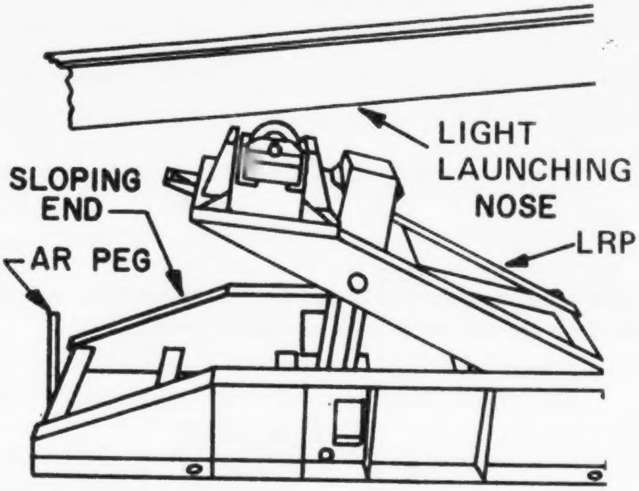
The LRP must be centered under the launching nose with its base parallel to the nose. Do not move nose sideways to fit LRP.


LAUNCHING NOSE
RIDGES ON BOTTOM OF NOSE SECTIONS FIT BETWEEN EDGES OF ROLLERS
90°
NOSE
GOOD
NOSE
NO GOOD

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(e) Position LRP under the launching nose with the base of the LRP against the AR peg.

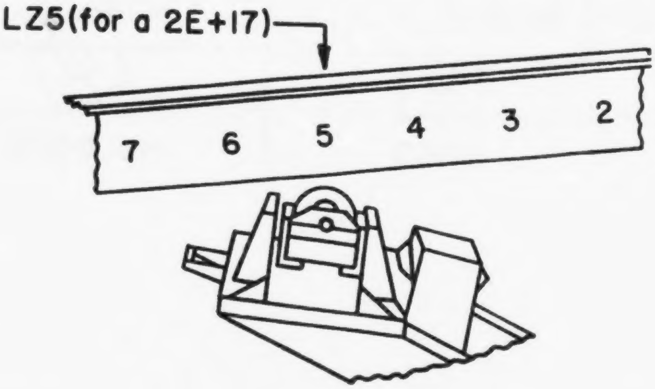

LIGHT LAUNCHING NOSE
SLOPING END
AR PEG
LRP

NOTE

A landing zone number higher than the given LZ is always permitted. Never use a LZ number lower than that given for the bridge being constructed.

(f) With the panel point of launch over the LRB/CRB check to ensure that the landing zone number (LZ) given below is over the center of the LRP roller.

Bridge	LZ	Bridge	LZ
2E + 13, 16, 19 and 20 bay	7	2E + 17 bay	5
2E + 14 bay	4	2E + 18 bay	9
2E + 15 bay	3	2E + 21 and 22 bay	2


LZ5(for a 2E+17)
7
6
5
4
3
2

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(g) Raise rear of bridge, far bank crew guides launching nose onto roller and will hold nose in place during next step.

For 2E + 13 bay bridge, PROCEED TO STEP 2.a. 66 .

For 2E + 14 bay bridge, PROCEED TO STEP 2.a. 67 .

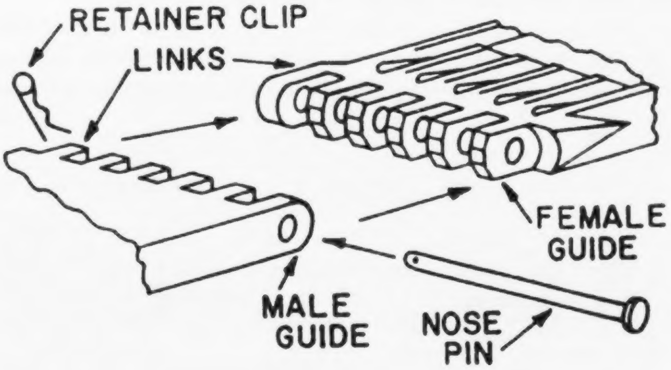
For 2E + 15, 2E + 18 and 2E + 19 bay bridges, PROCEED TO STEP 2.a. 70 .

64 Attach light tackle to reinforcing link and bridge at panel point given for bridge being constructed.

Bridge Length	Attach light tackle to
2E + 16 thru 2E + 18	6p7
2E + 20 thru 2E + 22	8p7

For 2E + 16 and 2E + 22 bay bridges, PROCEED TO STEP 2.a. 70 .

65 Attach one long link to link chain.



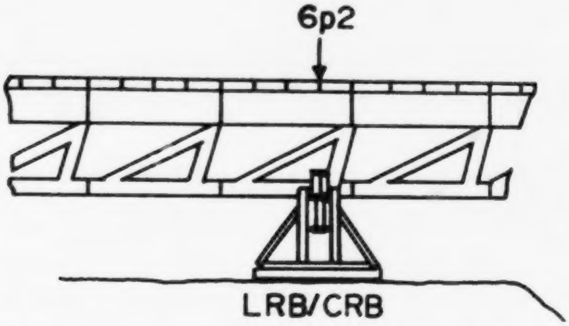
For 2E + 17, 2E + 20 and 2E + 21 bay bridges, PROCEED TO STEP 2.a. 70 .

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

66 Continue launch slowly until panel point given below is over LRB/CRB.

Bridge	Panel Point
2E + 13 bay	6p2

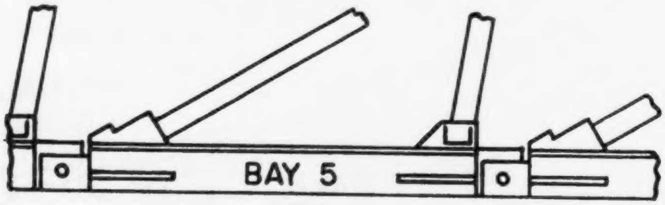


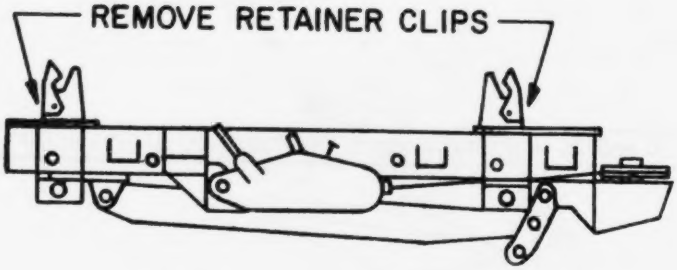
67 Attach post tensioning assembly under bay 5.

NOTE

Post tensioning assemblies can be right or left handed. Ensure that correct assembly is used. Pulley end of assembly must be toward closest bankseat beam with cable puller rigged on outside of bridge.

(a) Position post tensioning assembly under bay 5. Remove retainer clips from upper jaws of assembly, these clips will be put back when jaws lock around panel pins.

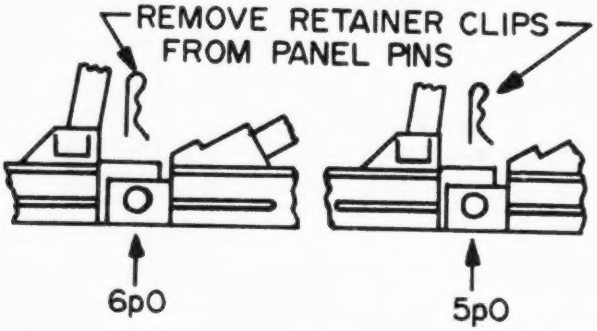




2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

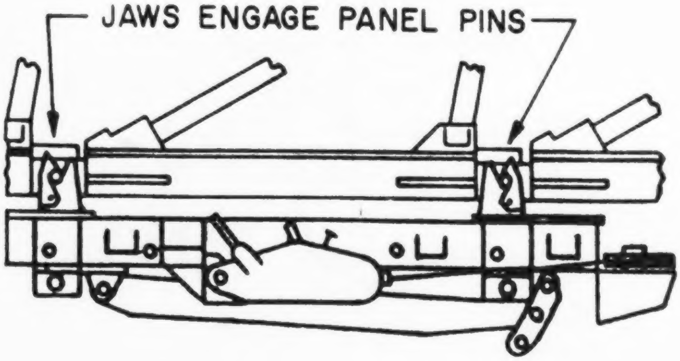
(b) Remove retainer clips from panel pins at 5p0 and 6p0 (bottom panel pins). These clips will be put back on after upper jaws are secured to panel pins.


REMOVE RETAINER CLIPS FROM PANEL PINS
6pO
5pO

NOTE

Ensure that panel pins are fully seated. If not, shoulder of pin will interfere with connection of post tensioning assembly.

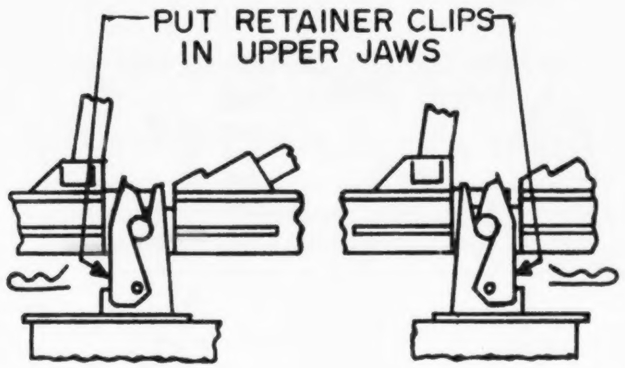
(c) Lift post tensioning assembly until upper jaws engage and lock around ends of panel pins in bottom panel.


JAWS ENGAGE PANEL PINS

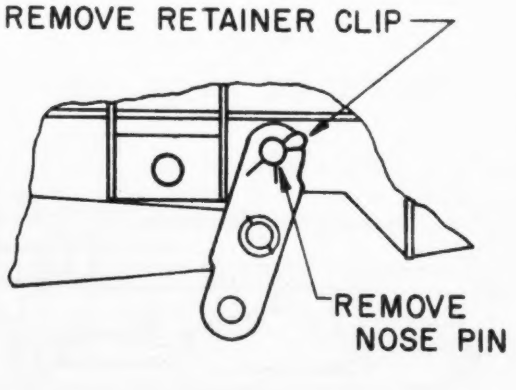
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(d) Put retainer clip in each upper jaw.


PUT RETAINER CLIPS IN UPPER JAWS

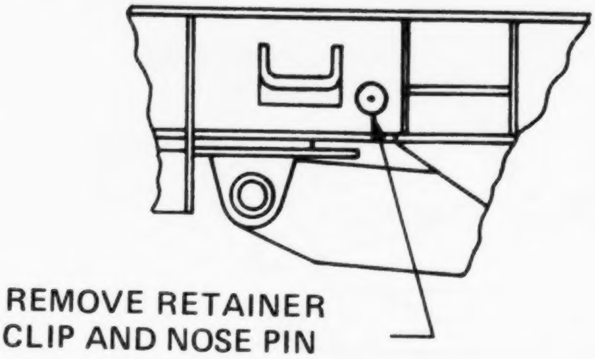
(e) Lift post to remove tension from nose pin, remove retainer clip and nose pin from frame and link connecting block. Place this pin in the bottom panel of bay 5.


REMOVE RETAINER CLIP
REMOVE NOSE PIN

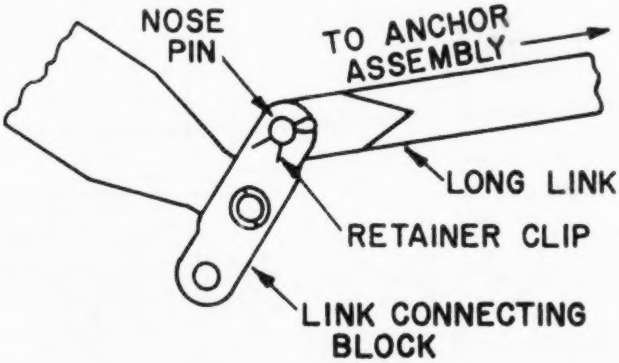
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(f) Remove retainer clip and secure sliding block in frame. Use this pin to secure block once post has been tensioned. Until needed this pin is kept in bottom panel of bay 5.


REMOVE RETAINER CLIP AND NOSE PIN

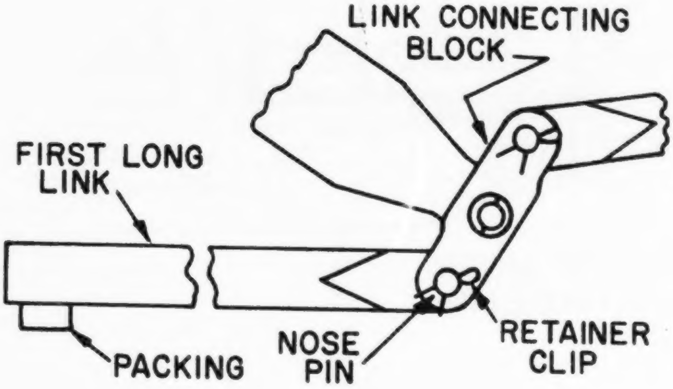
(g) Pin long link from anchor assembly to link connecting block with nose pin. Secure with retainer clip.


NOSE PIN
TO ANCHOR ASSEMBLY
LONG LINK
RETAINER CLIP
LINK CONNECTING BLOCK

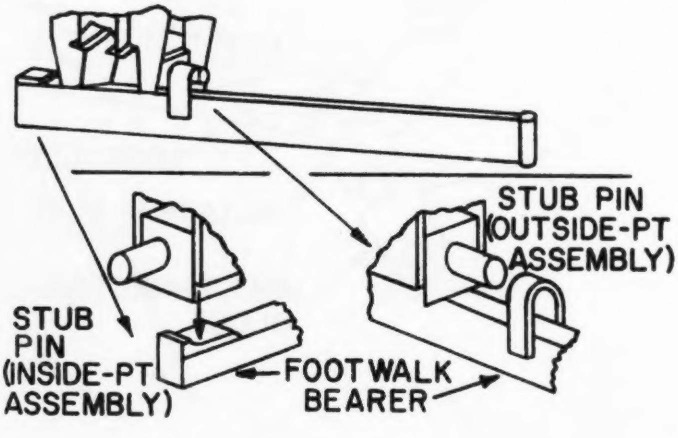
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(h) Pin first long link to post tensioning assembly link connecting block with nose pin. Secure with retainer clip. Place a piece of packing under rear of long link. This will make connection of next link easier.


LINK CONNECTING BLOCK
FIRST LONG LINK
PACKING
NOSE PIN
RETAINER CLIP

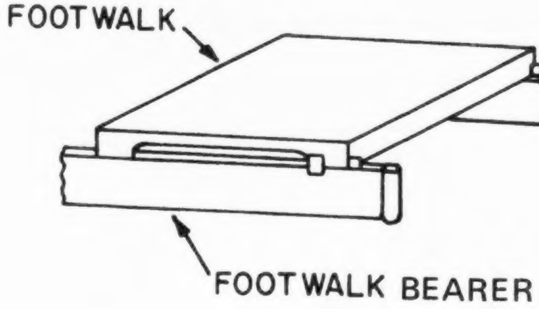
(i) Fit footwalk bearers to stub pins on post tensioning assembly.


STUB PIN (OUTSIDE-PT ASSEMBLY)
STUB PIN (INSIDE-PT ASSEMBLY)
FOOTWALK BEARER

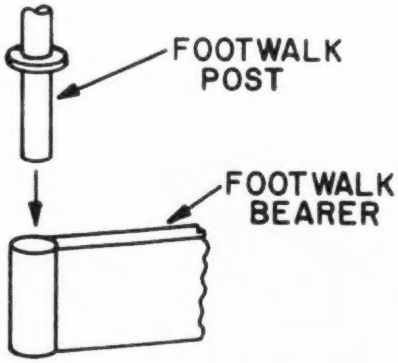
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(j) Place footwalk on bearers. Ensure that footwalk is fully seated on bearer.



(k) Put footwalk posts in holes of footwalk bearers.



(l) Put hook of guard rope in carrying bar bracket of bay 6 bottom panel. Feed rope through bottom hooks of both posts. Form a bight in rope at sway brace bracket of bottom panel 5 and secure bight in bracket with bracing pin. Feed rope through top hooks of posts. Put hook of guard rope in carrying bar bracket of bay 6 top panel.

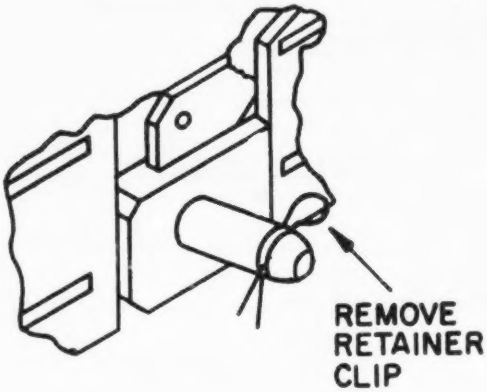
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

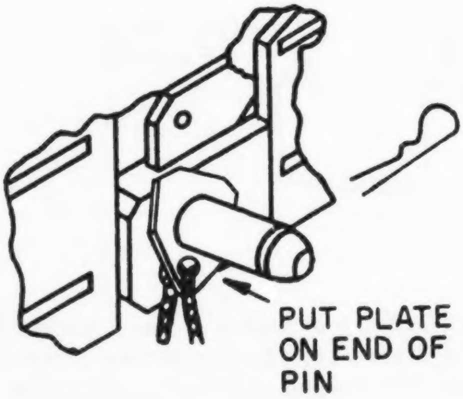
For 2E + 14 bay bridge, PROCEED TO STEP 2.a. 69 .

68 Attach light tackle to reinforcing link and bridge at panel point 4p7.

(a) Remove retainer clip from panel pin in bottom panel.


REMOVE
RETAINER
CLIP

(b) Fit plate of tackle over end of pin, and put retainer clip in end of panel.

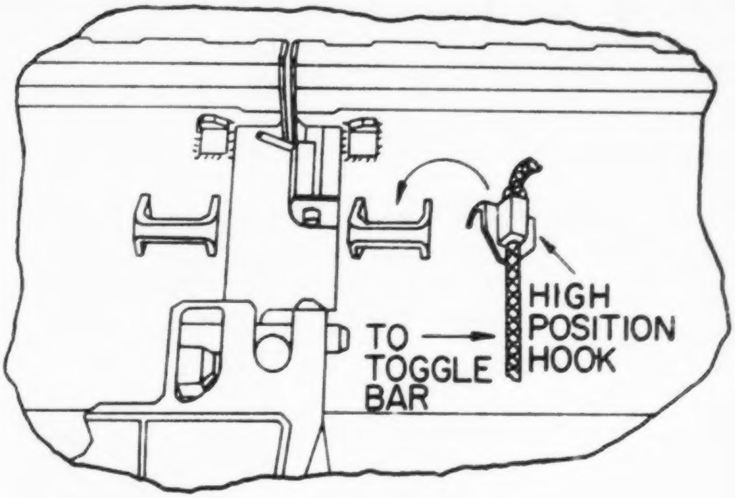

PUT PLATE
ON END OF
PIN

(c) Fit toggle bar of tackle into center hole of link.

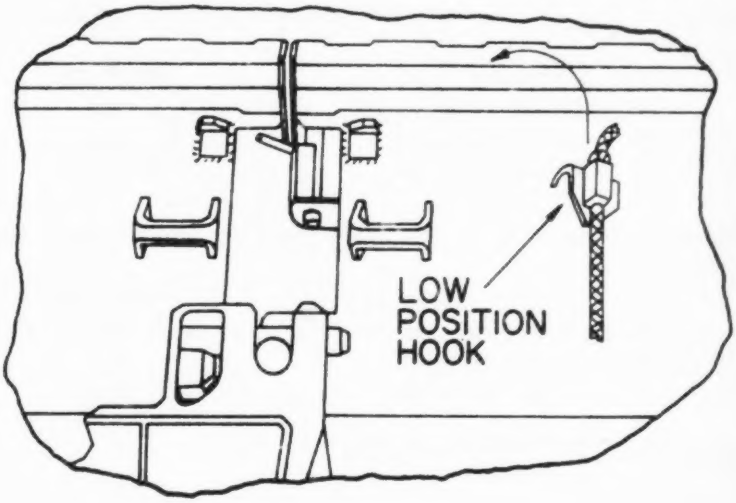
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(d) Place high position hook in carrying bar bracket of top panel.


TO TOGGLE BAR
HIGH POSITION HOOK

(e) Place low position hook in deck rail of top panel.

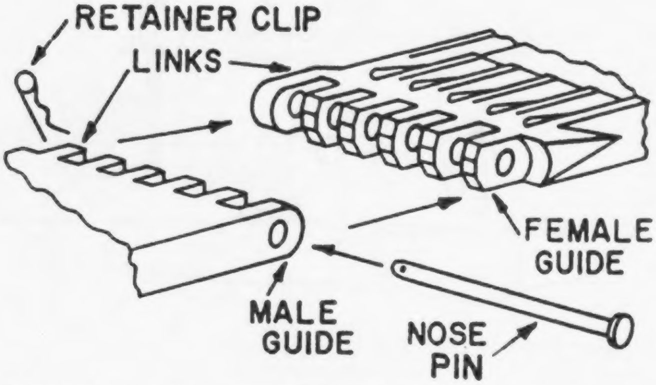

LOW POSITION HOOK

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

69 Connect additional links to first link.

Bridge Length	No. of Links
2E + 13	1 short 1 long
2E + 14	2 long



70 Continue launch to panel point (over LRB/CRB) given below for bridge being constructed.

Bridge	Panel Point
2E + 13 thru 2E + 15	7p4
2E + 16 thru 2E + 19	9p4
2E + 20 thru 2E + 22	11p4

71 Attach light tackle to link at panel point given below for bridge being constructed.

Bridge	Panel Point
2E + 13 thru 2E + 15	6p7
2E + 16 thru 2E + 19	8p7
2E + 20 thru 2E + 22	10p7

For 2E + 15 bay bridge, PROCEED TO STEP 2.a. 75 .

For 2E + 19 bay bridge, PROCEED TO STEP 2.a. 73 .

2-11. ASSEMBLY (Continued)

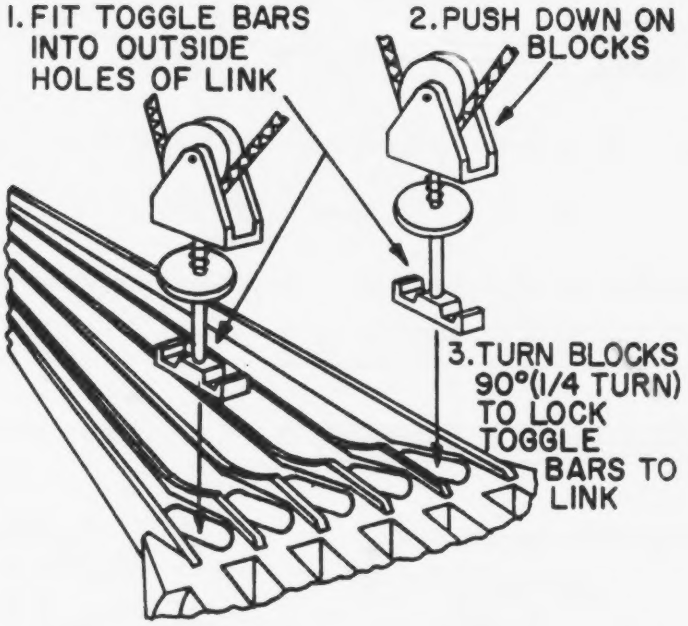
Step 2.a. Assembly Procedures (Continued).

NOTE

Anti-flutter tackle are connected to the link closest to the mid-point of the bridge as is possible.

72 Attach anti-flutter tackle to link chain.

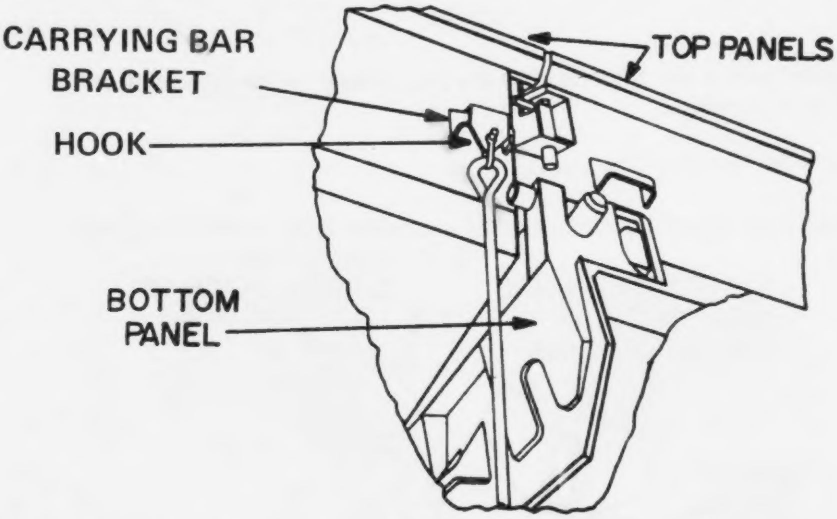
(a) Fit one toggle bar of anti-flutter tackle into each outer hole in reinforcing link.


1. FIT TOGGLE BARS INTO OUTSIDE HOLES OF LINK
2. PUSH DOWN ON BLOCKS
3. TURN BLOCKS 90°(1/4 TURN) TO LOCK TOGGLE BARS TO LINK

(b) Push toggle bar through hole and turn 90° (1/4 turn) to lock bar to link.

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

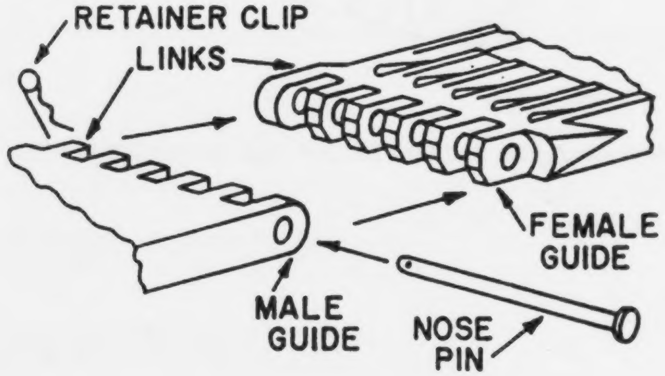

CARRYING BAR BRACKET
TOP PANELS
HOOK
BOTTOM PANEL

(c) Connect hooks of anti-flutter tackle to the carrying bar brackets of the top panel.

For 2E + 13 bay bridge, PROCEED TO STEP 2.a. 74 .

For 2E + 14 bay bridge, PROCEED TO STEP 2.a. 75 .

73 Attach one long link to link chain.

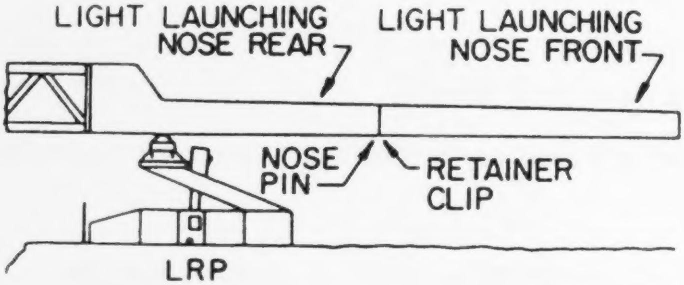

RETAINER CLIP
LINKS
FEMALE GUIDE
MALE GUIDE
NOSE PIN

For 2E + 19 and 2E + 22 bay bridges, PROCEED TO STEP 2.a. 75 .

2-11. ASSEMBLY (Continued)

Step 2.1. Assembly Procedures (Continued).

74. Remove front section of light launching nose.



75. Continue launch to panel point (over LRB/CRB) given below for bridge being constructed.

Bridge Length	Panel Point	Bridge Length	Panel Point
2E + 13	8p4	2E + 18	11p4
2E + 14	9p4	2E + 19	10p4
2E + 15	8p4	2E + 20	13p4
2E + 16	11p4	2E + 21	12p4
2E + 17	10p4	2E + 22	13p4

76. Attach light tackle to reinforcing link and bridge at panel point given below for bridge being constructed.

Bridge Length	Panel Point
2E + 13 and 2E + 15	7p7
2E + 14	8p7
2E + 17 and 2E + 19	9p7
2E + 16 and 2E + 18	10p7
2E + 21	11p7
2E + 20 and 2E + 22	12p7

For 2E + 13 and 2E + 16 bay bridges, PROCEED TO STEP 2.a. 80 .

For 2E + 14 bay bridge, PROCEED TO STEP 2.a. 79 .

For 2E + 17 bay bridge, PROCEED TO STEP 2.a. 88 .

For 2E + 18, 2E + 20 and 2E + 22 bay bridges, PROCEED TO STEP 2.a. 78 .

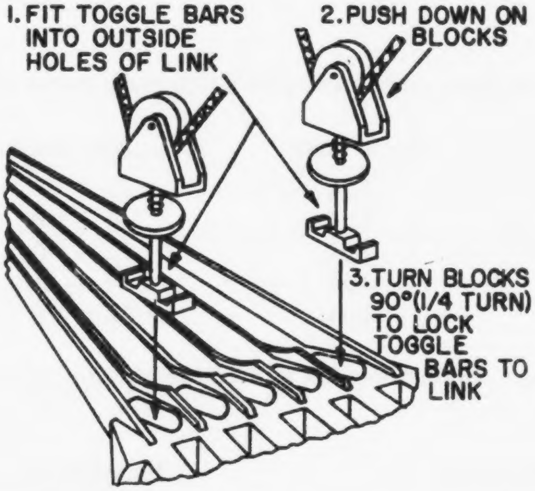
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

For 2E + 21 bay bridge, PROCEED TO STEP 2.a. 81 .

77 Attach anti-flutter tackle to link chain.

(a) Fit one toggle bar of anti-flutter tackle into each outer hole in reinforcing link.

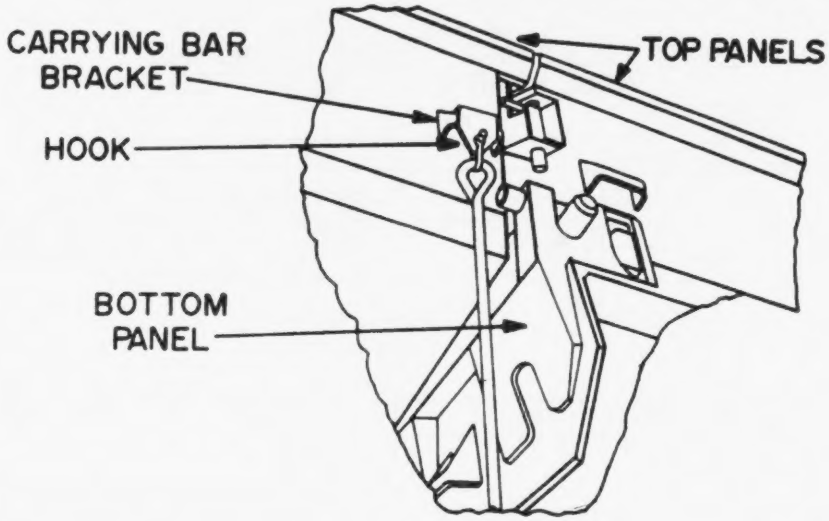

1. FIT TOGGLE BARS INTO OUTSIDE HOLES OF LINK
2. PUSH DOWN ON BLOCKS
3. TURN BLOCKS 90°(1/4 TURN) TO LOCK TOGGLE BARS TO LINK

(b) Push toggle bar through hole and turn 90° (1/4 turn) to lock bar to link.

2-11. ASSEMBLY (Continued)

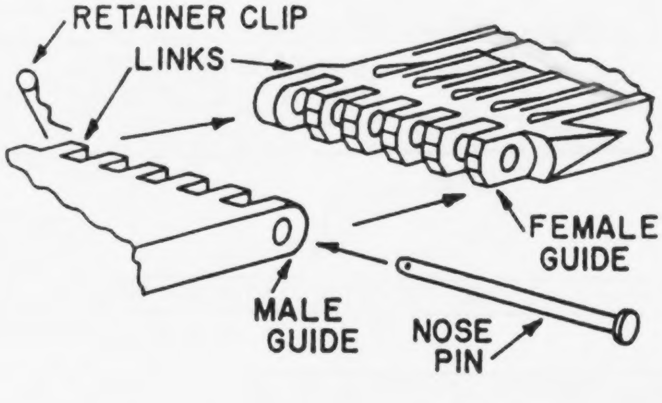
Step 2.a. Assembly Procedures (Continued).

(c) Connect hooks of anti-flutter tackle to the carrying bar brackets of the top panel.


CARRYING BAR BRACKET
TOP PANELS
HOOK
BOTTOM PANEL

For 2E + 19 bay bridge, PROCEED TO STEP 2.a. 79 .

78 Attach one long link to link chain.


RETAINER CLIP
LINKS
FEMALE GUIDE
MALE GUIDE
NOSE PIN

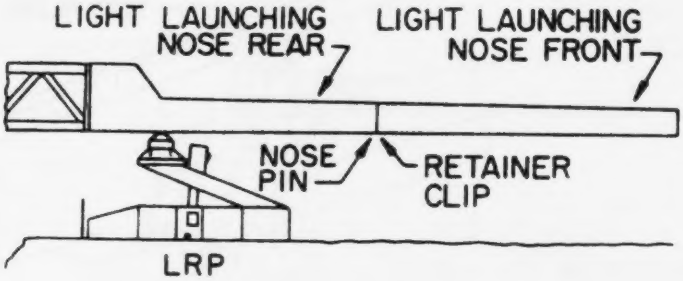
For 2E + 15 bay bridge, PROCEED TO STEP 2.a. 81 .

For 2E + 18 and 2E + 20 bay bridges, PROCEED TO STEP 2.a. 80 .

2-11. ASSEMBLY (Continued)

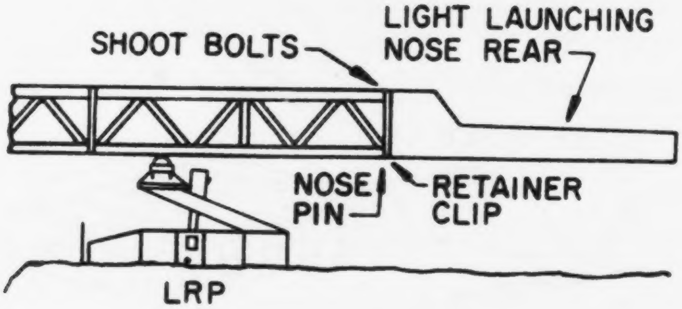
Step 2.a. Assembly Procedures (Continued).

79 Remove front section of light launching nose.


LIGHT LAUNCHING NOSE REAR
LIGHT LAUNCHING NOSE FRONT
NOSE PIN
RETAINER CLIP
LRP

For 2E + 19 bay bridge, PROCEED TO STEP 2.a. 81 .

80 Remove light launching nose rear.


SHOOT BOLTS
LIGHT LAUNCHING NOSE REAR
NOSE PIN
RETAINER CLIP
LRP

For 2E + 13 and 2E + 14 bay bridges, PROCEED TO STEP 2.a. 93 .

For 2E + 16 bay bridge, PROCEED TO STEP 2.a. 91 .

For 2E + 18 and 2E + 20 bay bridges, PROCEED TO STEP 2.a. 88 .

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

81 Continue launch to panel point (over LRB/CRB) given below for bridge being constructed.

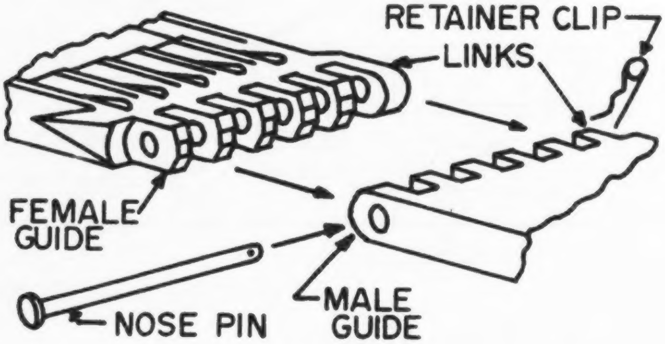
Bridge Length	Panel Point
2E + 15	10p4
2E + 19	12p4
2E + 21	14p4
2E + 22	15p0

82 Attach light tackle to reinforcing link and bridge at panel point given below for bridge being constructed.

Bridge Length	Panel Point
2E + 15	9p7
2E + 19	11p7
2E + 21	13p7
2E + 22	14p7

For 2E + 15 bay bridge, PROCEED TO STEP 2.a. 84 .

83 Attach one long link to link chain.



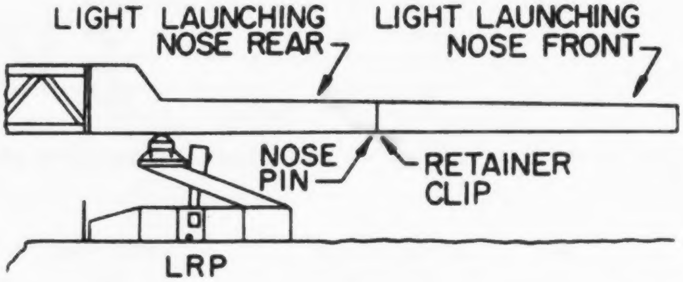
For 2E + 19 and 2E + 21 bay bridges, PROCEED TO STEP 2.a. 85 .

For 2E + 22 bay bridge, PROCEED TO STEP 2.a. 87 .

2-11. ASSEMBLY (Continued)

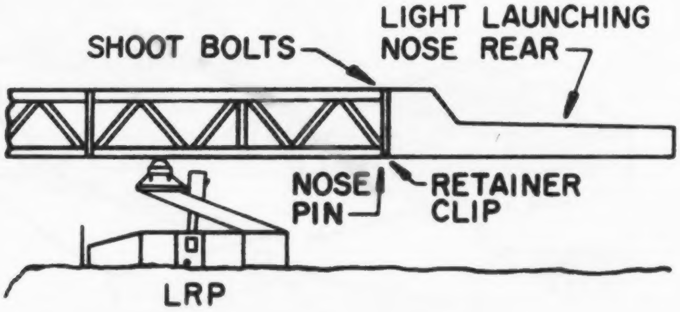
Step 2.a. Assembly Procedures (Continued).

84 Remove front section of light launching nose.


LIGHT LAUNCHING NOSE REAR
LIGHT LAUNCHING NOSE FRONT
NOSE PIN
RETAINER CLIP
LRP

For 2E + 15 bay bridge, PROCEED TO STEP 2.a. 93

85 Remove rear section of light launching nose.


SHOOT BOLTS
LIGHT LAUNCHING NOSE REAR
NOSE PIN
RETAINER CLIP
LRP

For 2E + 19 bay bridge, PROCEED TO STEP 2.a. 88 .

86 Continue launch to panel point (over LRB/CRB) 15p0.

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

NOTE

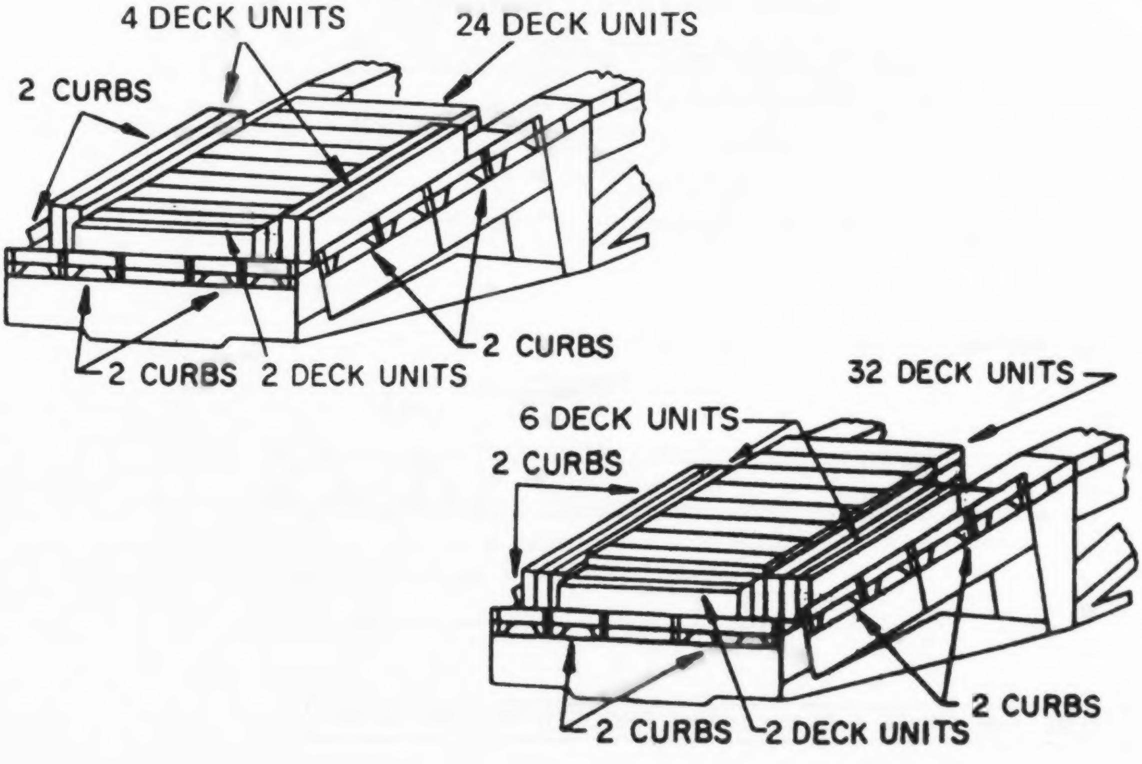
Counterweight deck units are required on 2E + 19 thru 2E + 22 bay bridges only. Counterweights are used in one or two stages.

Bridge Length 2E + No. of Bays	First Stage		Second Stage	
	Bridge At Boom Position	And The End Of Bridge Has Been Added	Bridge At Boom Position	Add
21	15p0 over RRB	3D	15p0 over LRB/CRB	27D + 6C
22	15p0 over RRB	3D	15p0 over LRB/CRB	37D + 6C

87. Add counterweight to end of bridge.

NOTE

The method used to place counterweights is from the headboard of dump trucks.


4 DECK UNITS
24 DECK UNITS
2 CURBS
2 CURBS
2 CURBS
2 DECK UNITS
32 DECK UNITS
6 DECK UNITS
2 CURBS
2 CURBS
2 CURBS
2 DECK UNITS

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

88 Continue launch to panel point (over LRB/CRB) given below for bridge being constructed.

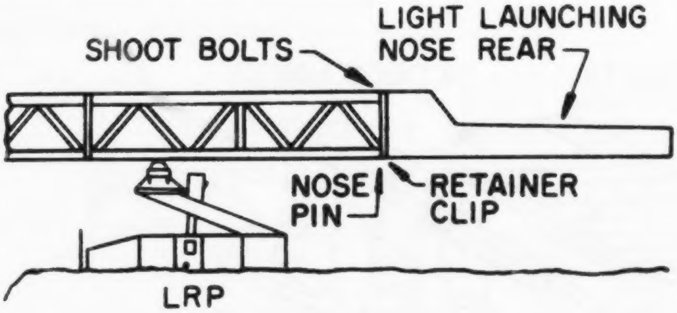
Bridge Length	Panel Point	Bridge Length	Panel Point
2E + 17	12p4	2E + 20	15p4
2E + 18	13p4	2E + 21	16p4
2E + 19	14p4	2E + 22	17p4

89 Attach light tackle to reinforcing link and bridge panel point given below for bridge being constructed.

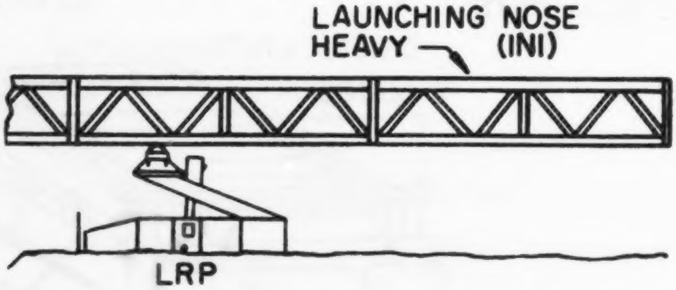
Bridge Length	Panel Point	Bridge Length	Panel Point
2E + 17	11p7	2E + 20	14p7
2E + 18	12p7	2E + 21	15p7
2E + 19	13p7	2E + 22	16p7

For 2E + 18 thru 2E + 22 bay bridges, PROCEED TO STEP 2.a. 91 .

90 Remove rear section of light launching nose.


SHOOT BOLTS
LIGHT LAUNCHING NOSE REAR
NOSE PIN
RETAINER CLIP
LRP

91 Remove first section of launching nose heavy (1N1).

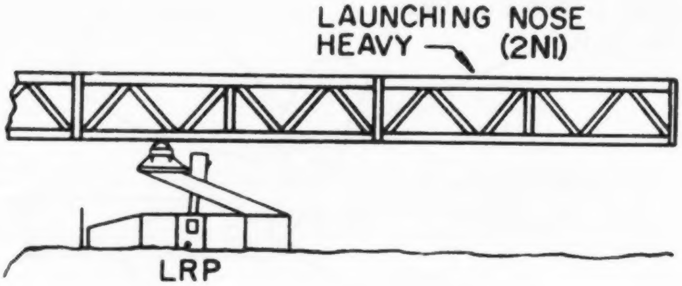

LAUNCHING NOSE HEAVY (INI)
LRP

For 2E + 16 thru 2E + 20 bay bridges, PROCEED TO STEP 2.a. 93 .

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

92 Remove second section of launching nose heavy (2N1).



93 Continue launch to panel point (over LRB/CRB) given below for bridge being constructed.

Bridge Length	Panel Point	Bridge Length	Panel Point
2E + 13	10p4	2E + 18	15p4
2E + 14	11p4	2E + 19	16p4
2E + 15	12p4	2E + 20	17p4
2E + 16	13p4	2E + 21	18p4
2E + 17	14p4	2E + 22	19p4

94 Pin post tensioning (PT) to bay required.

Bridge	Pin PT under Bay	Bridge	Pin PT under Bay
2E + 13	9	2E + 18	14
2E + 14	10	2E + 19	15
2E + 15	11	2E + 20	16
2E + 16	12	2E + 21	17
2E + 17	13	2E + 22	18

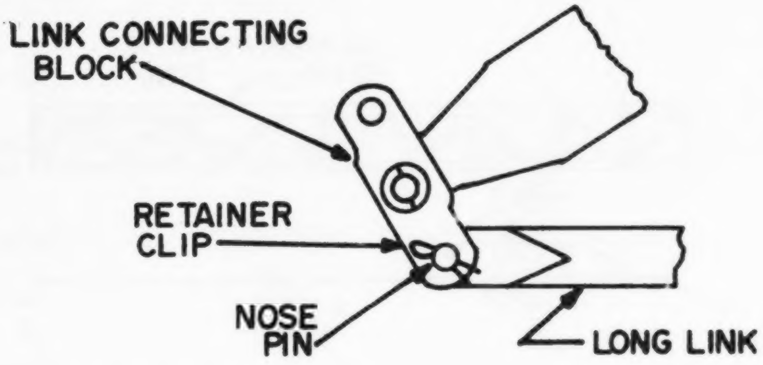
NOTE

Post tensioning assemblies can be right or left handed. Ensure that correct assembly is used. Pulley end of assembly must be toward closest bankseat beam with cable puller rigged on outside of bridge.

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

95 Attach one long link to link connecting block of post tensioning assembly.


LINK CONNECTING BLOCK
RETAINER CLIP
NOSE PIN
LONG LINK

96 Attach light tackle to long link connected to post tensioning assembly. Ensure that hook of tackle is positioned in the carrying bar bracket of the top panel next to the one that the post tensioning is connected to.

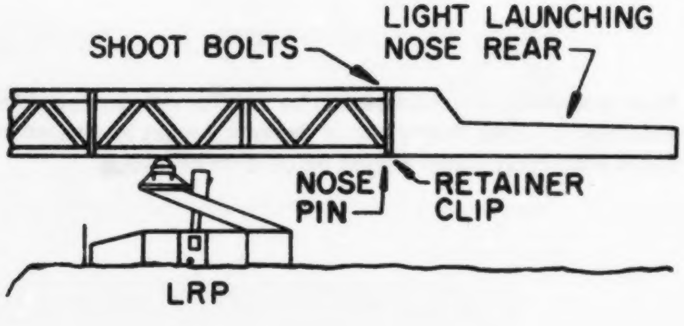
97 Remove and disassemble the rear roller beam (RRB).

For 2E + 13 and 2E + 14 bay bridges, PROCEED TO STEP 2.a. 99 .

For 2E + 16 thru 2E + 20 bay bridges, PROCEED TO STEP 2.a. 100 .

For 2E + 21 and 2E + 22 bay bridges, PROCEED TO STEP 2.a. 101 .

98 Remove rear section of light launching nose.

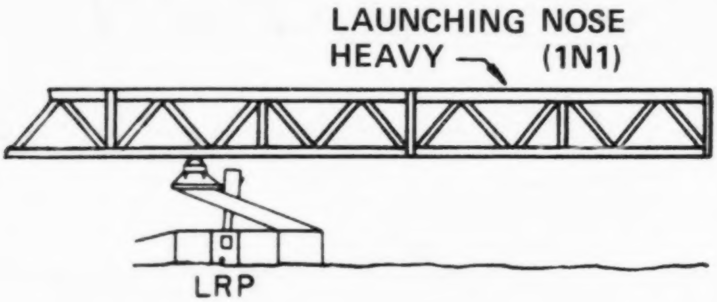

SHOOT BOLTS
LIGHT LAUNCHING NOSE REAR
NOSE PIN
RETAINER CLIP
LRP

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

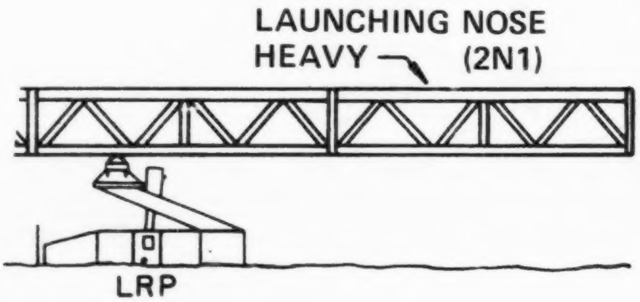
For 2E + 15 bay bridge, PROCEED TO STEP 2.a. 102 .

99 Remove first section of launching nose heavy (1N1).


LAUNCHING NOSE HEAVY (1N1)
LRP

For 2E + 13 and 2E + 14 bay bridges, PROCEED TO STEP 2.a. 102 .

100 Remove second section of launching nose heavy (2N1).

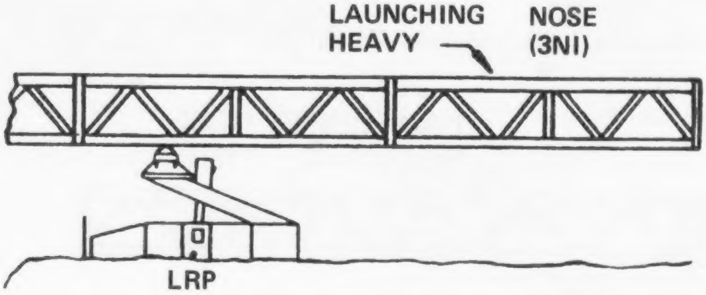

LAUNCHING NOSE HEAVY (2N1)
LRP

For 2E + 16 thru 2E + 20 bay bridges, PROCEED TO STEP 2.a. 102 .

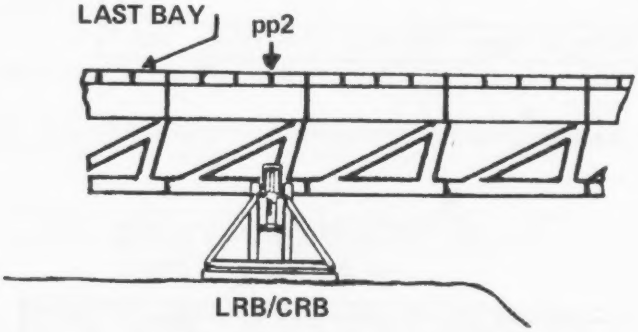
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

101 Remove third section of launching nose heavy (3N1).



102 Continue launch to panel point 2 of the next to last bay. Remove and disassemble the front roller beam (FRB).



103 Position anchor assembly (AA) under bridge in front of LRB/CRB with anchor junction block toward the gap.

(a) Fork end anchors should be in transit position.

(b) Long packing must be placed under anchor assembly as a skid.

(c) The fork end anchor end of the long link is placed on packing on the roller beam cross girder.

(d) Pin the long link from the post tensioning to the anchor junction block with a nose pin. Secure nose pin with a retainer clip.

2-11. ASSEMBLY (Continued)

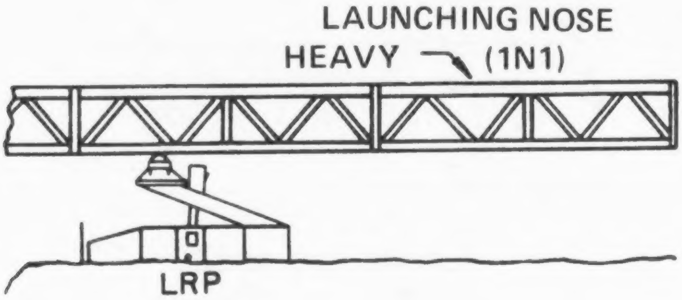
Step 2.a. Assembly Procedures (Continued).

For 2E + 13 and 2E + 14 bay bridges, PROCEED TO STEP 2.a. 105 .

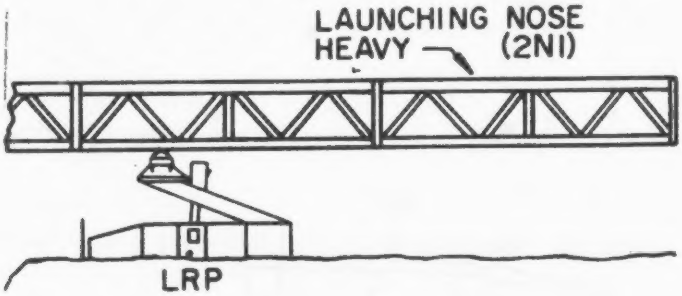
for 2E + 16 thru 2E + 20 bay bridges, PROCEED TO STEP 2.a. 106 .

For 2E + 21 and 2E + 22 bay bridges, PROCEED TO STEP 2.a. 107 .

104 Remove first section of launching nose heavy (1N1).


LAUNCHING NOSE
HEAVY (1N1)
LRP

105 Remove second section of launching nose heavy (2N1).


LAUNCHING NOSE
HEAVY (2NI)
LRP

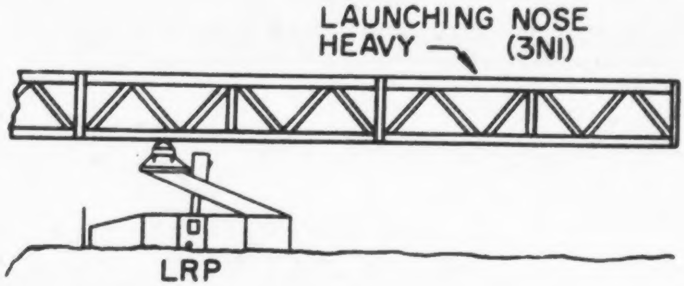
For 2E + 13 thru 2E + 15 bay bridges, PROCEED TO STEP 2.a. 108 .

2-11. ASSEMBLY (Continued)

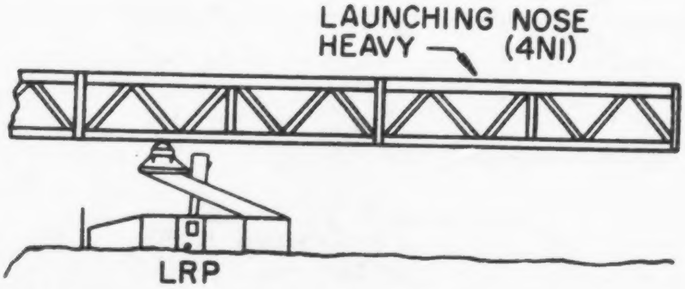
Step 2.a. Assembly Procedures (Continued).

106 Remove third section of launching nose heavy (3N1).

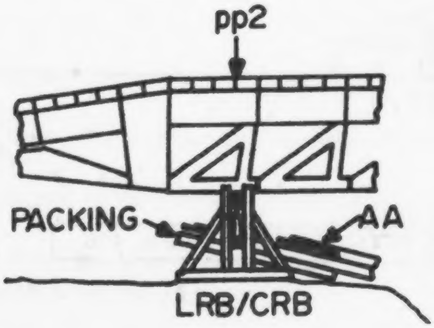
For 2E + 16 and 2E + 17 bay bridges, PROCEED TO STEP 2.a. 108 .


LAUNCHING NOSE HEAVY (3NI)
LRP

107 Remove fourth section of launching nose heavy (4N1).


LAUNCHING NOSE HEAVY (4NI)
LRP

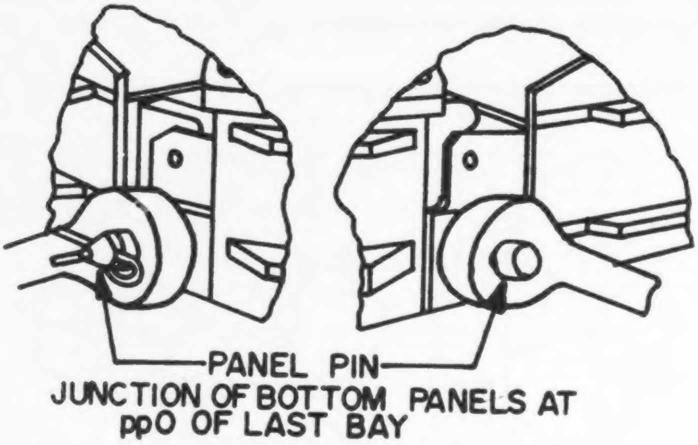
108 Continue launch to panel point 2 of the last bay over LRB/CRB.


pp2
PACKING
AA
LRB/CRB

2-11. ASSEMBLY (Continued)

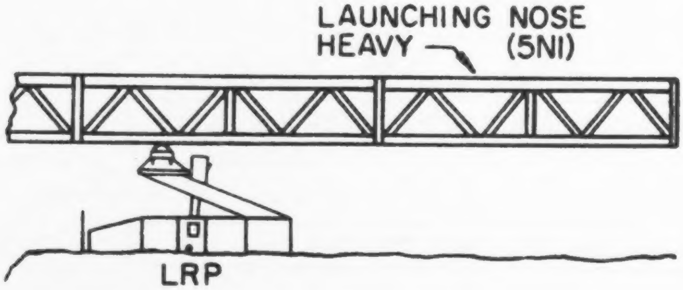
Step 2.a. Assembly Procedures (Continued).

109 Fit fork end anchors of short link over bottom panel pin at panel point 0 of the last bay.

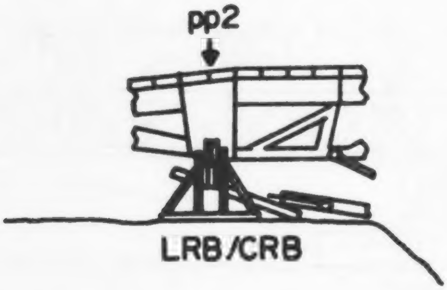

PANEL PIN
JUNCTION OF BOTTOM PANELS AT
ppO OF LAST BAY

For 2E + 13 thru 2E + 21 bay bridges, PROCEED TO STEP 2.a. 111 .

110 Remove fifth section of launching nose heavy (5N1).


LAUNCHING NOSE
HEAVY (5NI)
LRP

111 Continue launch until panel point 2 of junction panel is over LRB/CRB.



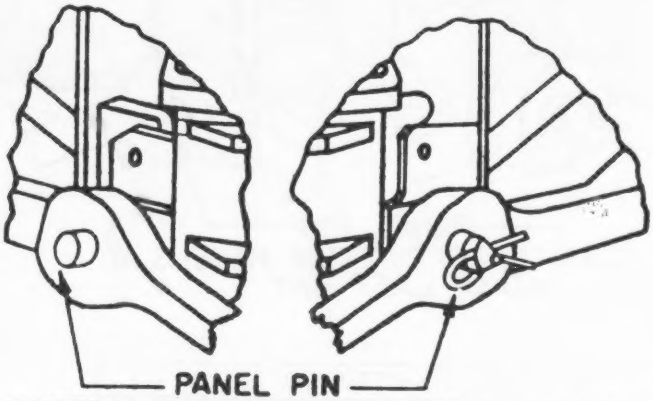
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

NOTE

It may be necessary to lift or lower the anchor junction block and the end of the link chain to allow the fork end anchors of the long link to be fitted to the bottom panel pin at panel point Dp0.

112. Fit fork end anchors of long link over bottom panel pin at panel point Dp0.



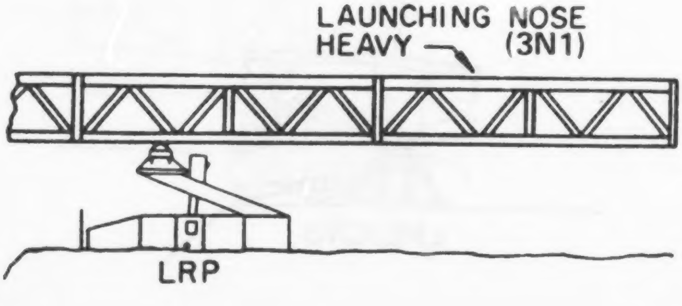
BOTTOM AND JUNCTION PANEL AT Dp0

For 2E + 16 and 2E + 17 bay bridges, PROCEED TO STEP 2.a. 114 .

For 2E + 19 thru 2E + 21 bay bridges, PROCEED TO STEP 2.a. 115 .

For 2E + 18 and 2E + 22 bay bridges, PROCEED TO STEP 2.a. 116 .

113. Remove third section of launching nose heavy (3N1).

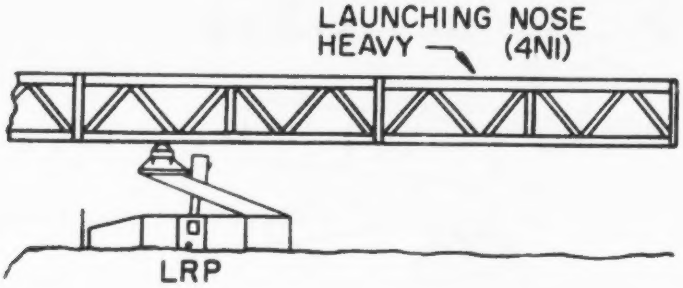


2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

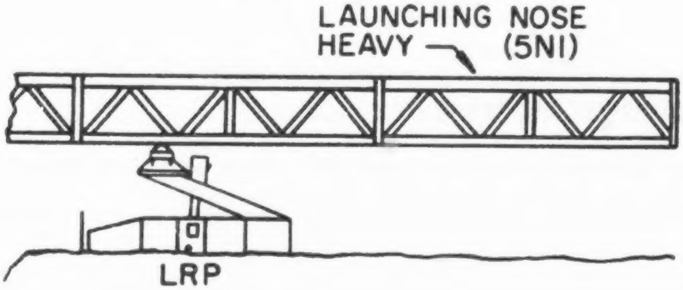
For 2E + 13 thru 2E + 15 bay bridges, PROCEED TO STEP 2.a. 116 .

114 Remove fourth section of launching nose heavy (4N1).


LAUNCHING NOSE HEAVY (4NI)
LRP

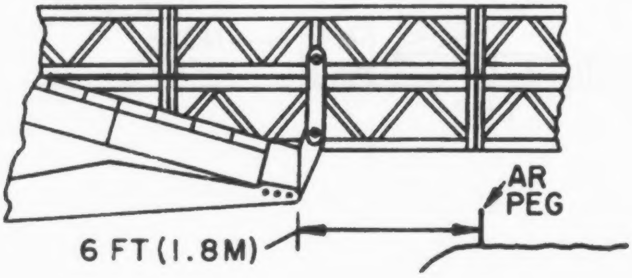
For 2E + 16 and 2E + 17 bay bridges, PROCEED TO STEP 2a. 116 .

115 Remove fifth section of launching nose heavy (5N1).


LAUNCHING NOSE HEAVY (5NI)
LRP

116 Continue launch until either:

(a) The far bank bankseat beam approaches within 6 ft (1.8 m) of AR peg.

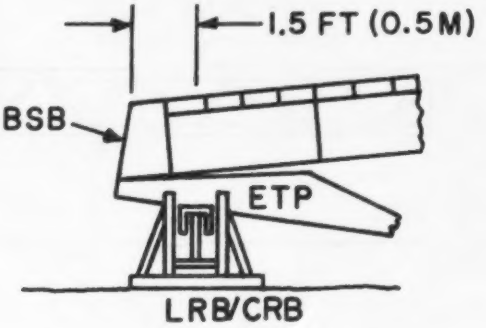

AR PEG
6 FT (1.8M)

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

OR

(b) The near bank end of bridge is within 1.5 ft (0.5 m) (2 panel points) of center of the LRB/CRB rollers.



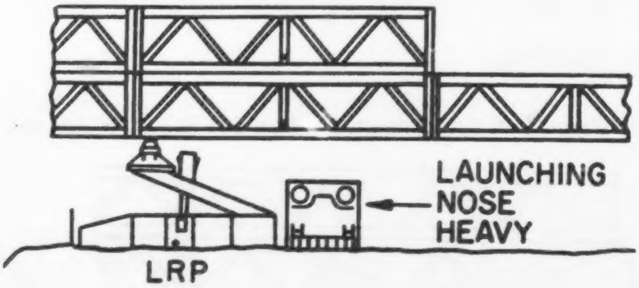
(c) Stop launch when one of the above are met.

117 Reposition the landing roller pedestal.

NOTE

If two LRPs are not available, use procedures (a) thru (f). If two are available, use procedures (g) thru (i).

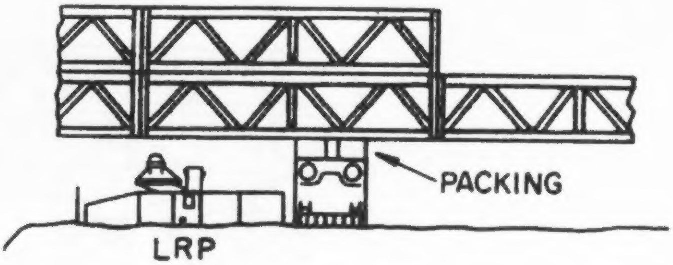
(a) Place one launching nose heavy section under nose. Nose section is placed perpendicular to the launching nose and against base at the rear of the LRP.



2-11. ASSEMBLY (Continued)

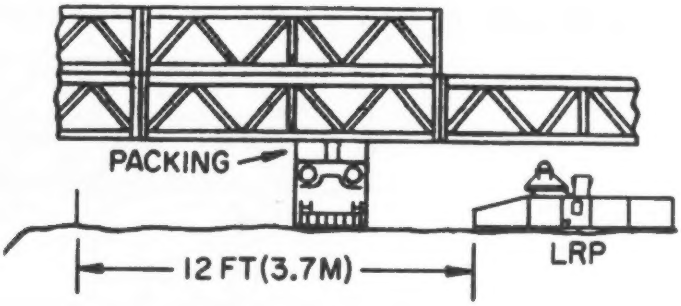
Step 2.a. Assembly Procedures (Continued).

(b) Place two pieces of packing on top of nose section to protect the edges of nose section.

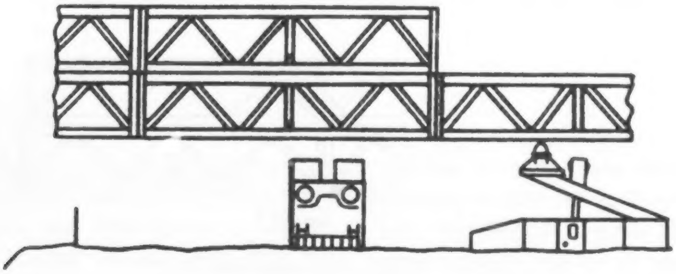


(c) Operate hydraulic jack to lower the launching nose onto the packing and nose section.

(d) Remove the landing roller pedestal and relocate it under the launching nose so the base of it is 12 ft (3.7 m) from the AR peg.



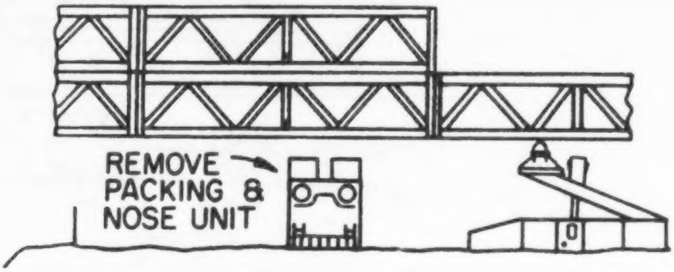
(e) Operate hydraulic jack to lift the launching nose off the packing and nose section.



2-11. ASSEMBLY (Continued)

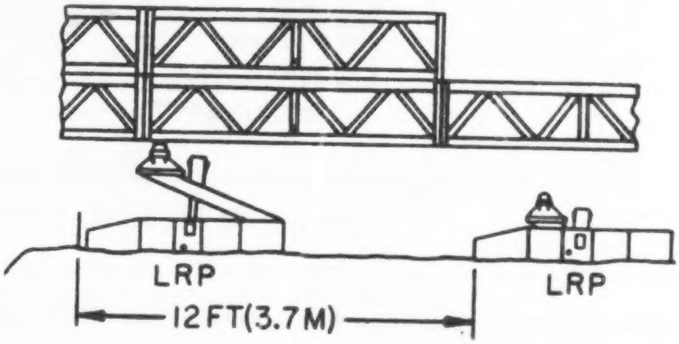
Step 2.a. Assembly Procedures (Continued).

(f) Remove packing and nose section from under launching nose.

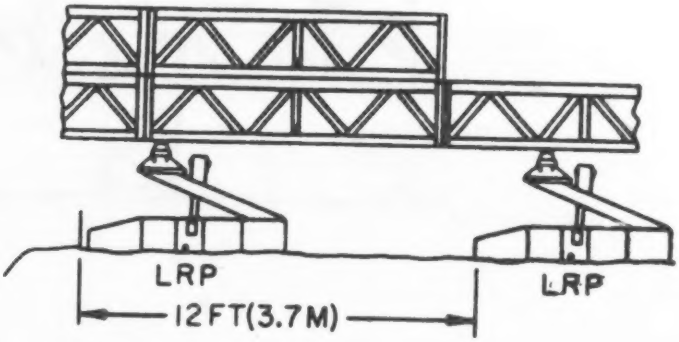

REMOVE PACKING & NOSE UNIT

If nose section was used to reposition LRP, PROCEED TO STEP 2.a. 118 .

(g) Position spare LRP under launching nose 12 ft (3.7 m) from AR peg.


LRP
LRP
12 FT(3.7M)

(h) Operate hydraulic jack until this LRP is fully raised.

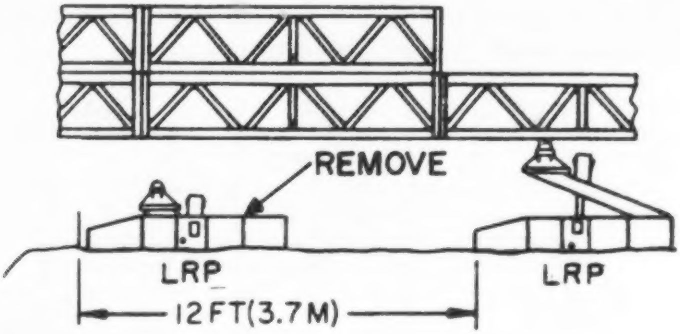

LRP
LRP
12 FT(3.7M)

(i) Remove first LRP from under nose.

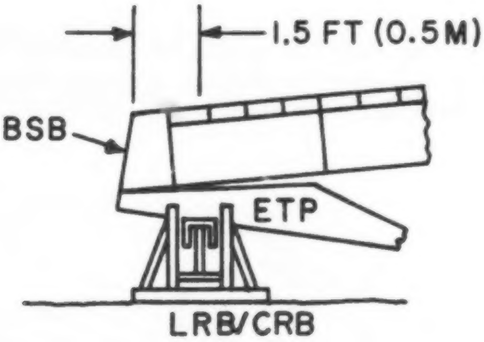
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(j) Operate hydraulic jack in first LRP to lower it completely. Remove from site.



118 Continue launch until near bank bankseat beam is 1.5 ft (0.5 m) (2 panel points) from the center of the LRB/CRB roller.



CAUTION

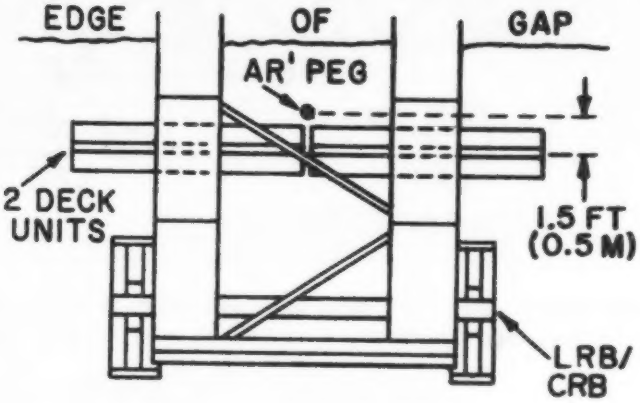
Do not try to increase the height of packing or number of deck units used for the jacking roller beam (JRB). Increasing the height or number of these items will cause the JRB to be unstable. If site conditions require an increase in the height of the JRB, then long ramps (upside down) or top panels may be used in place of deck units.

2-11. ASSEMBLY (Continued)

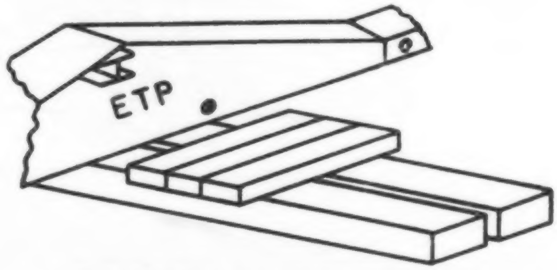
Step 2.a. Assembly Procedures (Continued).

119 Install jacking roller beam (JRB) 1.5 ft (0.46 m) from AR peg.

(a) Place deck units side by side under each end taper panel. These deck units are placed perpendicular to the bridge centerline, and centered on the 1.5 ft (0.46 m) mark. Deck units must be placed upside down to increase bearing surface.



(b) Place three pieces of packing side by side on deck units. Packing is placed under end taper panels and parallel to centerline. Packing prevents metal to metal contact which could cause damage or cause the roller beam to slide under bridge.

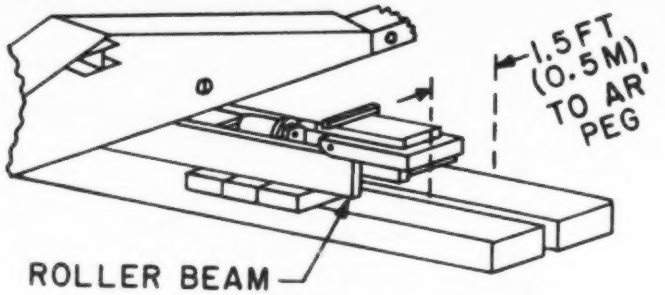


3 PIECES OF PACKING PLACED ON TOP OF DECK UNITS UNDER ETP

(c) Place a roller beam across the packing until it is centered on the bridge and the 1.5 ft (0.46 m) mark. Ensure that roller catches are unlocked (vehicle is holding bridge).

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

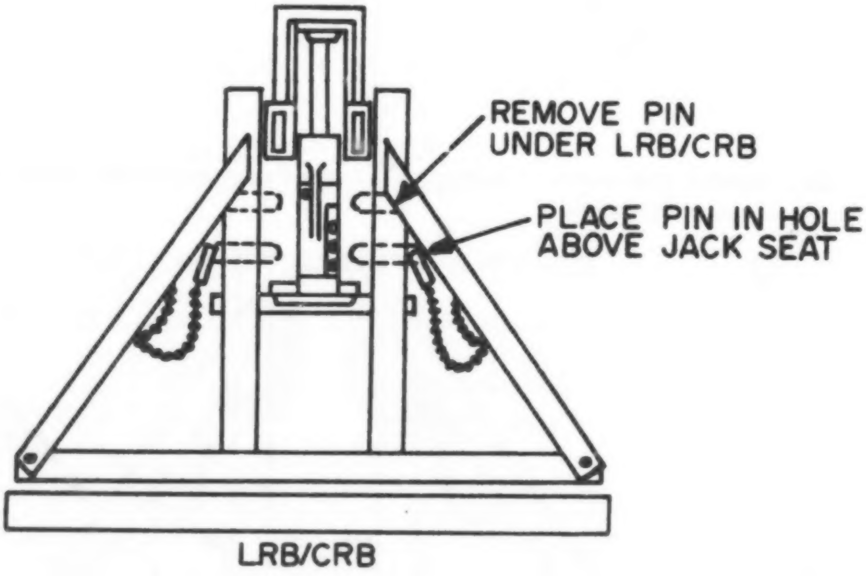

1.5 FT (0.5 M) TO AR PEG
ROLLER BEAM

NOTE

Lowering the LRB/CRB to put the bridge on the jacking roller beam may require re-staging the jacks. To determine if re-staging is needed measure the distance from the center of roller to the bottom of the end taper panel. If this distance is within 2 in (5 cm) of being the same as the amount of ram showing in jacks, then re-staging will be needed.

120 Lower LRB/CRB to put bridge on jacking roller beam.

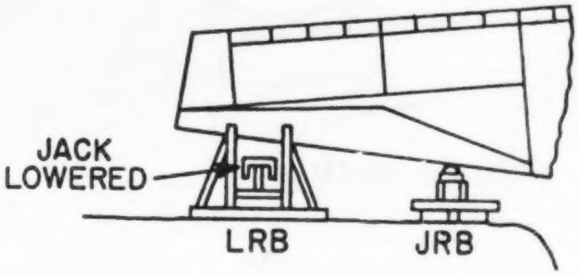
(a) Remove support pins from under LRB/CRB. Reposition the support pins if re-staging is required.


REMOVE PIN UNDER LRB/CRB
PLACE PIN IN HOLE ABOVE JACK SEAT
LRB/CRB

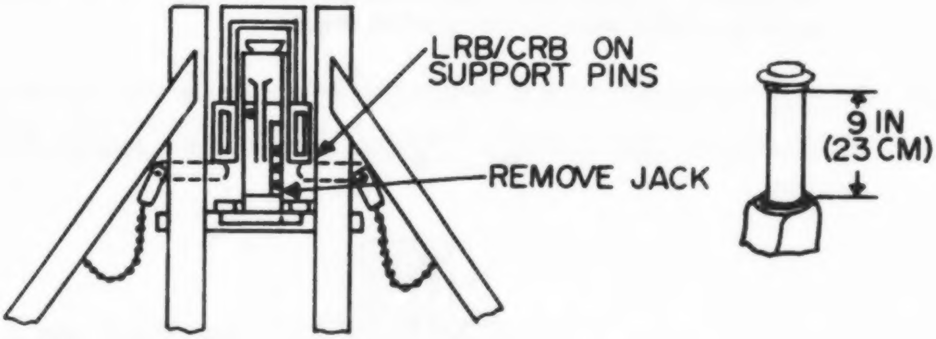
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

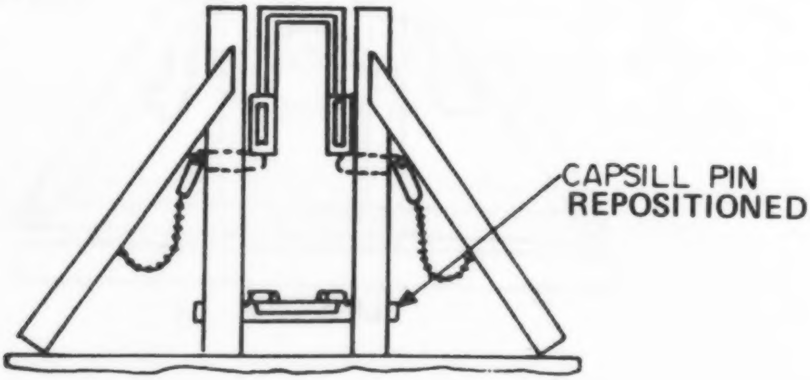
(b) Operate hydraulic jack to lower bridge onto jacking roller beam, or LRB/CRB onto support pins.


JACK
LOWERED
LRB
JRB

(c) Remove jacks from jack seats. If re-staging, operate jacks to raise jack head 9 in (23 cm).


LRB/CRB ON
SUPPORT PINS
REMOVE JACK
9 IN
(23 CM)

(d) Remove jack seats. If re-staging, remove capsill or support pin(s) and reposition pin(s) in a lower set of holes.

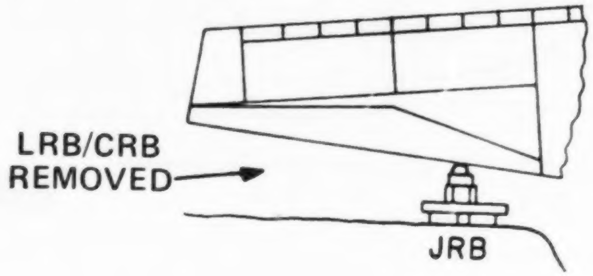

CAPSILL PIN
REPOSITIONED

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

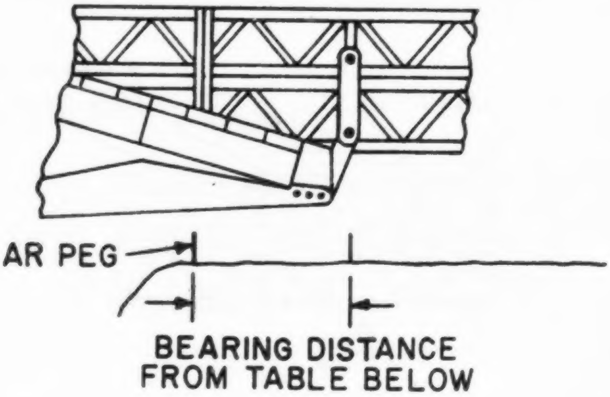
(e) If re-staging, put jack seat on pin(s). Put jack on seats. Operate jack to lift LRB/CRB off of pins. Remove pins and operate jacks to lower bridge onto the jacking roller beam. Remove jacks, jack seats and support or capsill pin(s).

121 Remove LRB/CRB from under the end of bridge.



122 Disassemble LRB/CRB.

123 Continue launch until far bank bankseat beam is over far bank, and the required bearing is reached.



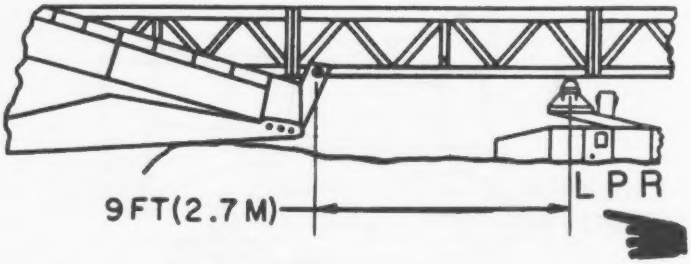
BRIDGE LENGTH	MIN. BEARING
2E + 13, 2E + 14, and 2E + 16 thru 2E + 20	3.0 ft (0.9 m)
2E + 15	3.5 ft (1.1 m)
2E + 21	3.75 ft (1.14 m)
2E + 22	5.25 ft (1.6 m)

Lock rollers on jacking roller beam.

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

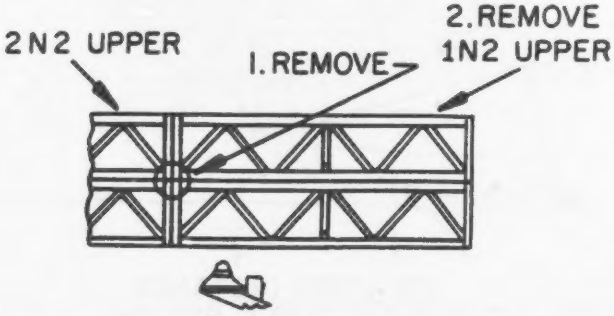
124 Lower far bank end of bridge by operating jack in landing roller pedestal. Reposition landing roller pedestal so the center of roller is 9 ft (2.7 m) from nose roller on bankseat beam. Raise LRP until roller touches bottom of launching nose.



125 Disconnect vehicle from bridge.

126 Remove launching nose heavy sections until the section resting on the landing roller pedestal is reached. If removing double story nose proceed to (a) below. If removing single story nose proceed to (e).

(a) Remove retainer clips and washers from headless pin in nose link. Remove headless pin.

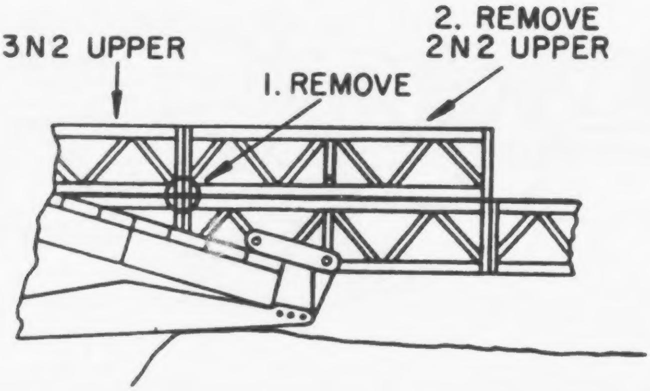


(b) Remove retainer clips and nose pin connecting 1N2 and 2N2 (upper). Unlock shoot bolts and remove 1N2 (upper) section by pulling and lifting it off of lower sections.

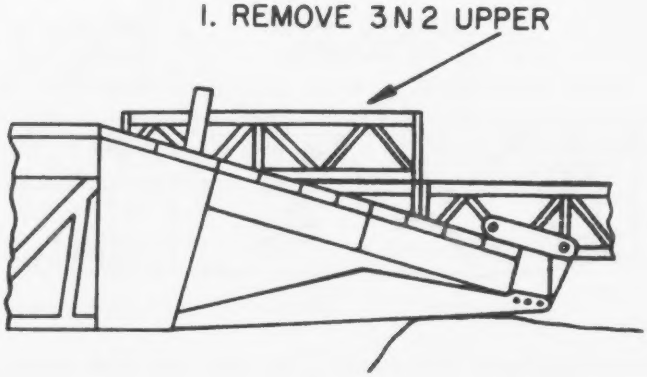
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(c) Repeat (b) to remove 2N2 (upper).


3N2 UPPER
2. REMOVE
2N2 UPPER
I. REMOVE

(d) Pull and lift 3N2 off of lower section.

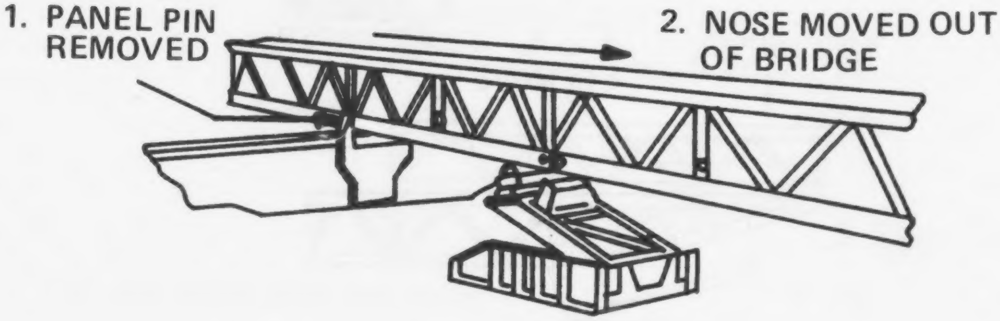

I. REMOVE 3N2 UPPER

(e) Remove retainer clip from panel pin in nose roller and prepare to remove panel pin.

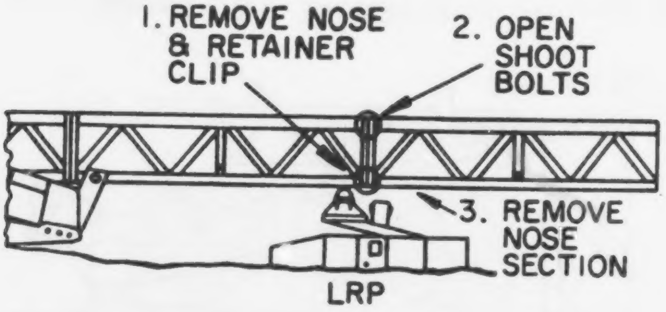
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(f) With one man on launching nose cross girder to lift gravity catch, four men pull nose sections away from gap. Panel pin is removed from nose roller as nose is moved. Remove launching nose links (if used) as pin is removed.


1. PANEL PIN REMOVED
2. NOSE MOVED OUT OF BRIDGE

(g) The four men pull the last three nose sections until the nose pin connecting the first two has passed the landing roller. Stop movement of nose.

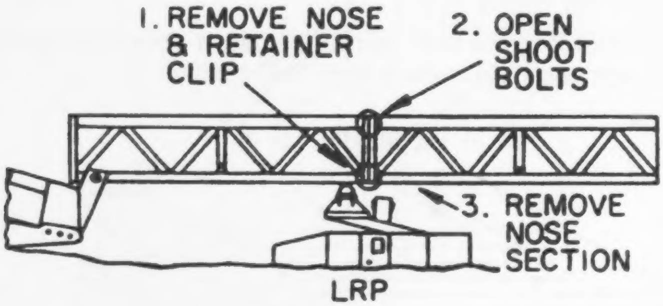

1. REMOVE NOSE & RETAINER CLIP
2. OPEN SHOOT BOLTS
3. REMOVE NOSE SECTION
LRP

(h) Remove the first nose section by removing retainer clip, nose pin and unlocking shoot bolts.

(i) Move the last two nose sections until the nose pin has passed the landing roller.

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).



(j) Repeat Step (h) to remove the second nose section.

(k) Remove last nose section, move landing roller pedestal to the side of site, and remove the nose roller from the bankseat beam.

127 Remove launching nose cross girder and posts.

128 Far bank crew returns to near bank.

NOTE

There are three methods of putting the near bank end of bridge on the ground. The first is using the standard hydraulic jacks and jackposts. The second is using the davit posts and jacking brackets. The third is using a crane if one is available.

The procedures for the first method start at Step 2.a. 129, the second at Step 2.a. 130 and the third at Step 2.a. 131. The method used depends on the availability of equipment.

PROCEED TO STEP FOR METHOD CHOSEN

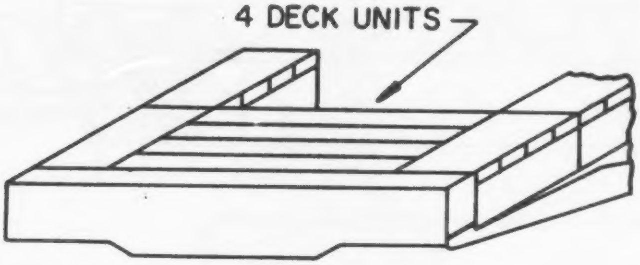
129 Put bridge on ground using hydraulic jacks and jack posts in the same way as is done when constructing bridges 2E + 12 bays and under.

2-11. ASSEMBLY (Continued)

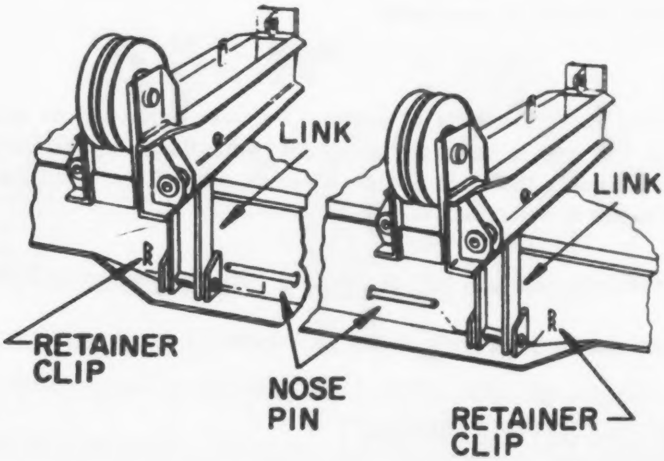
Step 2.a. Assembly Procedures (Continued).

130 To put bridge on ground using davit posts and jacking brackets.

(a) Place 4 deck units in first 4 recesses in end of bridges. If deck unit counterweights were used for launch, put deck units and curbs in their final position.



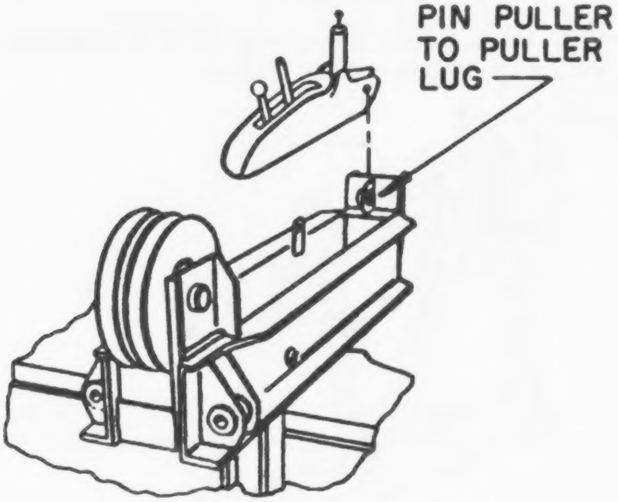
(b) Unpin jacking bracket link from the stowed position and place bracket on bankseat beam and deck. Position bracket over jack post bracket so link can be pinned to bankseat beam. Pin link to beam with a nose pin and secure with retainer clip.



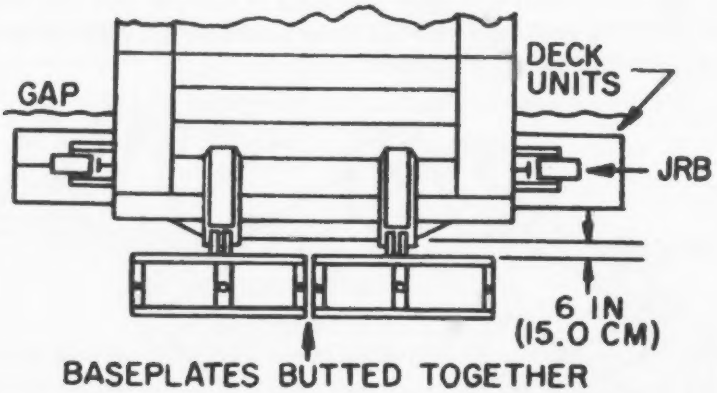
(c) Pin cable pullers in place in jacking bracket.

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).


PIN PULLER
TO PULLER
LUG

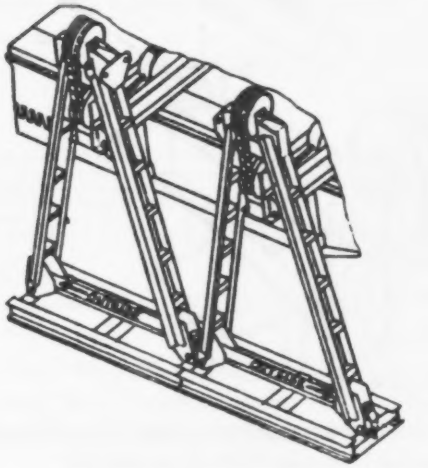
(d) Place two adjustable support baseplates about 6 in (15.0 cm) from final position of bankseat beam. Ends of baseplates butt together at centerline.


GAP
DECK
UNITS
JRB
6 IN
(15.0 CM)
BASEPLATES BUTTED TOGETHER

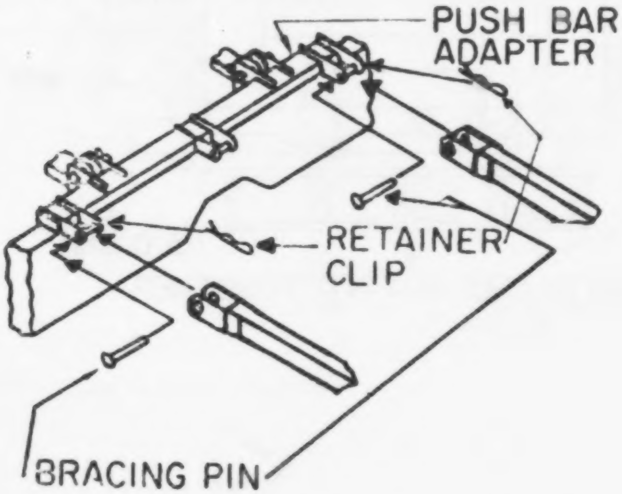
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(e) Place one davit upright on each baseplate with arrows pointing to outside of bridge. Reeve puller cables and pin terminals to lugs on jacking brackets.



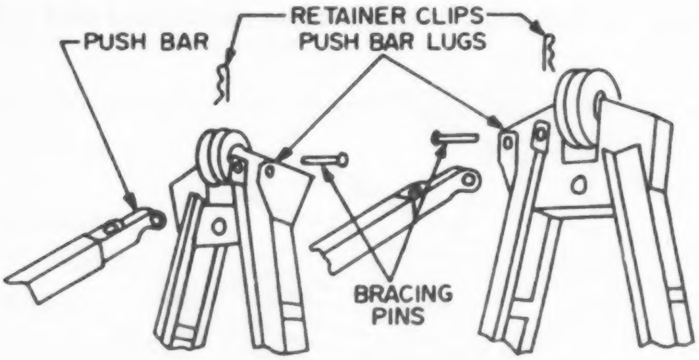
(f) Position truck near end of bridge. Ensure that truck is straight with the bridge and centered over centerline. Attach 2 push bars (short or long) to adapter on truck. Ends of push bars are attached to the outside brackets of adapter.



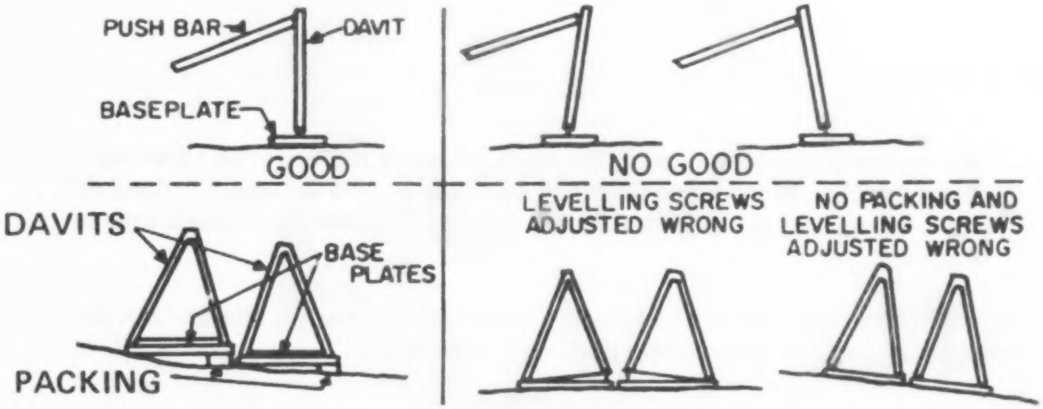
(g) Move truck forward slowly guiding swivel ends of push bars into lugs on davit posts. Pin with bracing pins and secure with retainer clips.

2-11. ASSEMBLY (Continued)

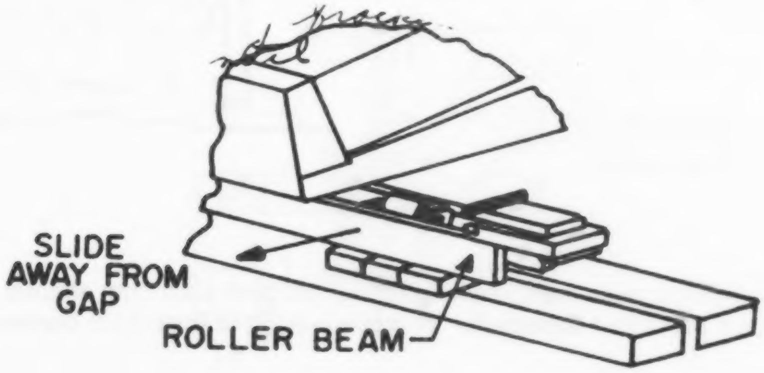
Step 2.a. Assembly Procedures (Continued).


PUSH BAR
RETAINER CLIPS
PUSH BAR LUGS
BRACING PINS

(h) Set davit posts and puller cables vertically in both directions by moving baseplates and truck as necessary. Baseplates may have to be levelled with packing.


PUSH BAR
DAVIT
BASEPLATE
GOOD
NO GOOD
DAVITS
BASE PLATES
PACKING
LEVELLING SCREWS ADJUSTED WRONG
NO PACKING AND LEVELLING SCREWS ADJUSTED WRONG

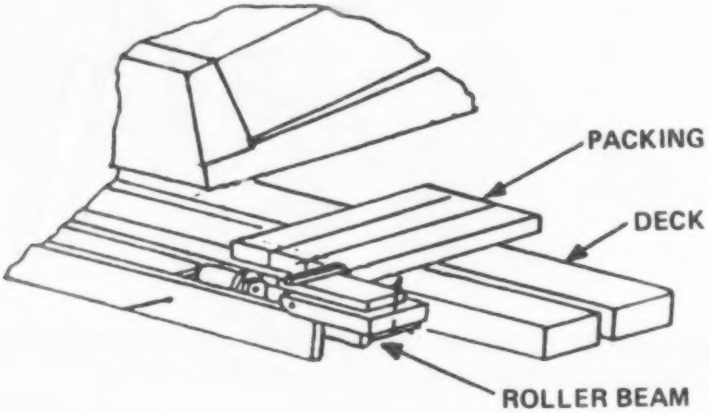
(i) Lift bridge from jacking roller beam with cable pullers using 2 personnel on each puller handle with handle fully extended. Ensure that the puller cable does not become fouled on the gusset plate. Lift bridge until safety chains can be connected to jacking brackets. Secure chains to brackets. Pay out pullers until weight of bridge is taken by safety chains.


SLIDE AWAY FROM GAP
ROLLER BEAM

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

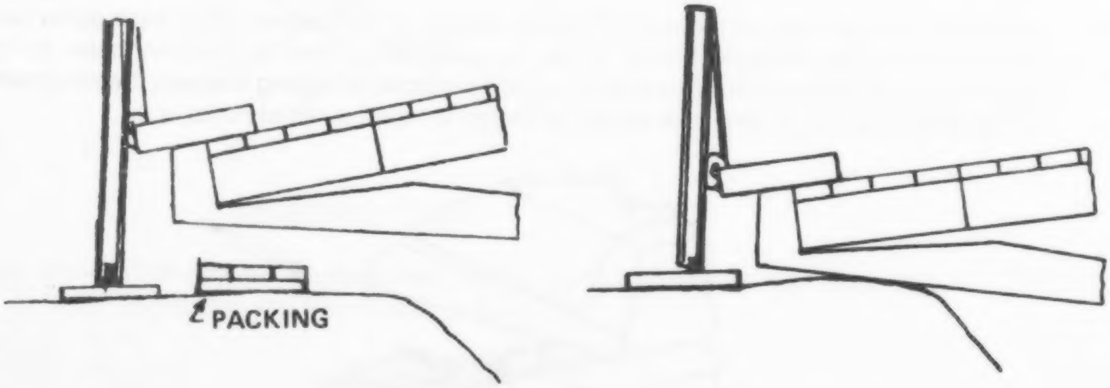
(j) Slide roller beam out from under bridge. Remove packing and deck units.



CAUTION

During lowering of the birdge, the truck will have to be moved carefully to prevent fouling of the cables in the gusset plates. This will result in the davit posts being slightly out of vertical at the end of lowering. Pickets may be required.

(k) Operate cable pullers to lift bridge high enough to release safety chains. Operate cable pullers to lower bridge to ground or onto packing if required.



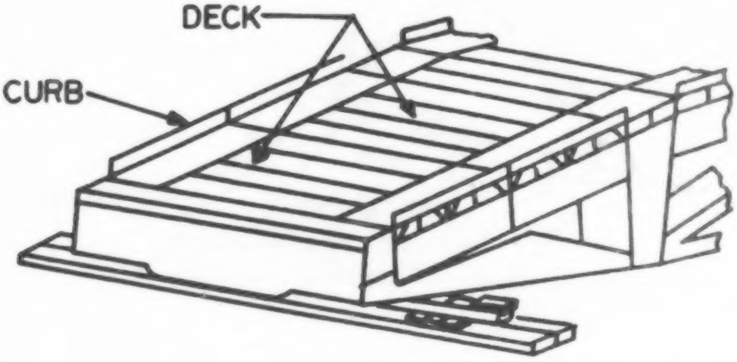
(l) Remove cable from pulleys and puller. Disconnect push bars from adapter and davit posts. Remove davit posts and baseplates. Remove jacking bracket from bankseat beam.

2-11. ASSEMBLY (Continued)

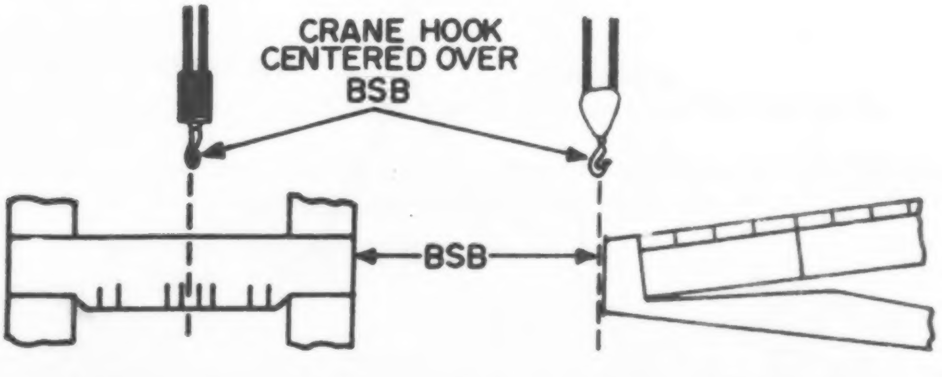
Step 2.a. Assembly Procedures (Continued).

131 To put bridge on ground using crane.

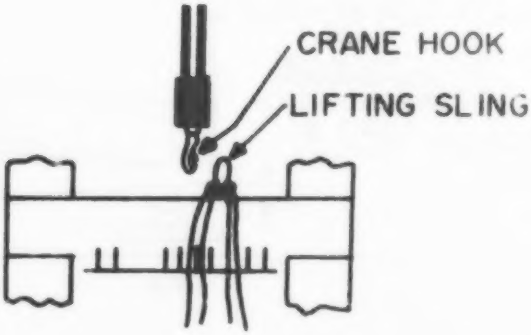
(a) If deck unit counterweights were used for launch, put deck units and curbs in their final position.



(b) Position crane near rear of bridge on centerline. Ensure that hook and block of crane is centered over bankseat beam.


CRANE HOOK CENTERED OVER BSB
BSB

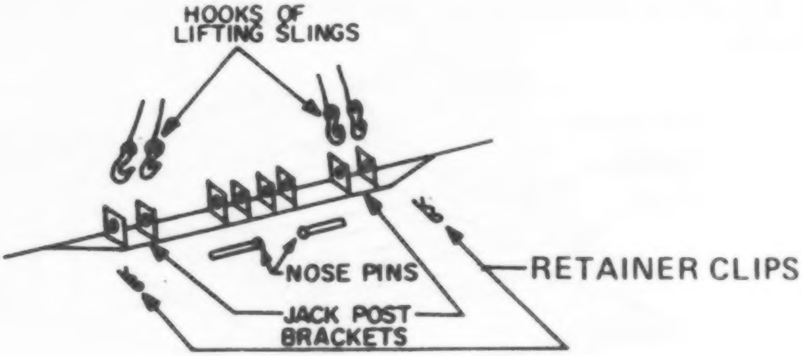
(c) Lower crane hook and attach 4 legged lifting sling. All four legs of sling will be used to lift bridge.


CRANE HOOK
LIFTING SLING

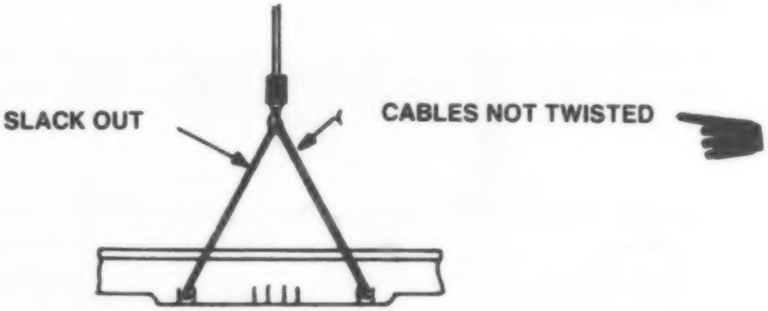
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

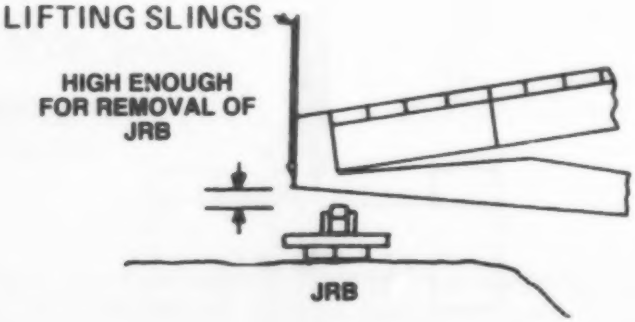
(d) Place hooks of two legs in each jack post bracket. Tip of hooks must face outside of bankseat beam. Pin hooks in with a nose pin and secure with retainer clip.


HOOKS OF LIFTING SLINGS
NOSE PINS
RETAINER CLIPS
JACK POST BRACKETS

(e) Operate crane to take the slack from the sling legs. Ensure that cables are not twisted.


SLACK OUT
CABLES NOT TWISTED

(f) Lift bridge slowly and only high enough to permit the roller beam to be slid to one side of site.


LIFTING SLINGS
HIGH ENOUGH FOR REMOVAL OF JRB
JRB

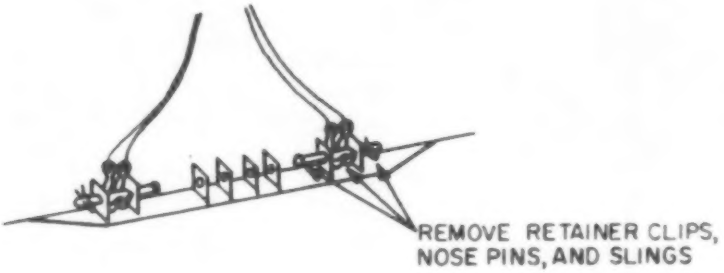
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(g) Remove packing and deck units.

(h) Lower bridge slowly to ground or onto packing if required.

(i) Remove nose pins and hooks from bankseat beam. Remove slings from hook of crane. Move crane from site.


REMOVE RETAINER CLIPS,
NOSE PINS, AND SLINGS

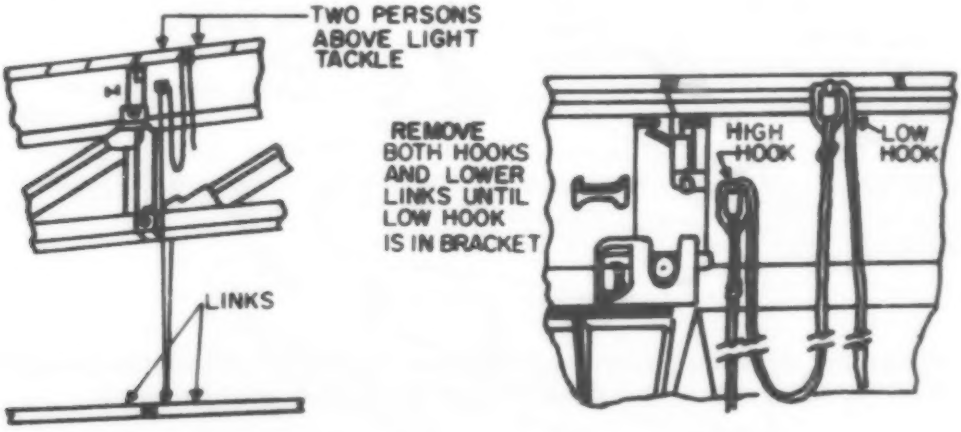
NOTE

Lowering of link chain is completed on one side of bridge before the second side is lowered.

132 Lowering link chain.

(a) Position two persons on bridge girder on one side of bridge above each light tackle.

(b) Two persons will pull up on the light tackle to release the high hook from the top panel carrying bar bracket. Ensure that this lift is made all at one time.

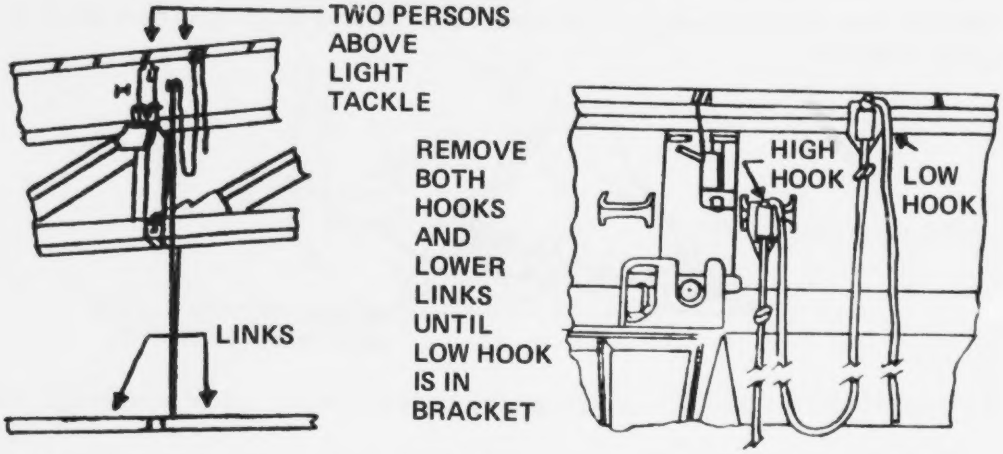

TWO PERSONS
ABOVE LIGHT
TACKLE
LINKS
REMOVE
BOTH HOOKS
AND LOWER
LINKS UNTIL
LOW HOOK
IS IN BRACKET
HIGH
HOOK
LOW
HOOK

2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

(c) Slowly lower link chain until low hook can be placed in carrying bar bracket of top panel.

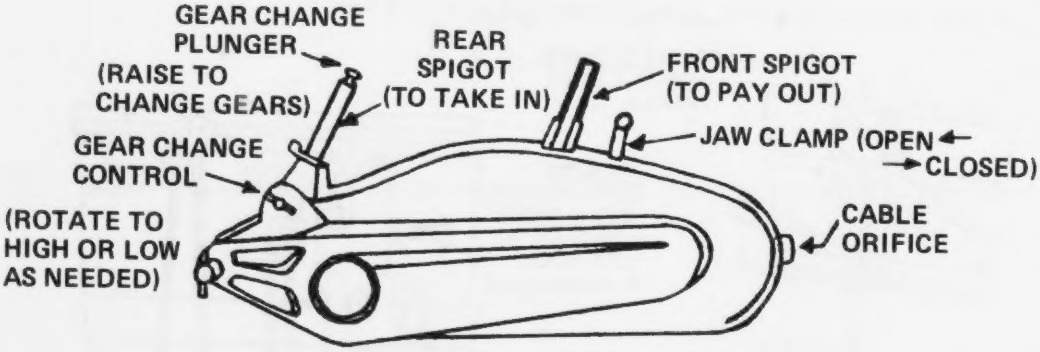
(d) Repeat (a) thru (c) to lower link chain under other girder.


TWO PERSONS ABOVE LIGHT TACKLE
LINKS
REMOVE BOTH HOOKS AND LOWER LINKS UNTIL LOW HOOK IS IN BRACKET
HIGH HOOK
LOW HOOK

133 Tensioning link chain on both sides of bridge.

(a) Position two persons on each footwalk to operate cable puller to tension link chain.

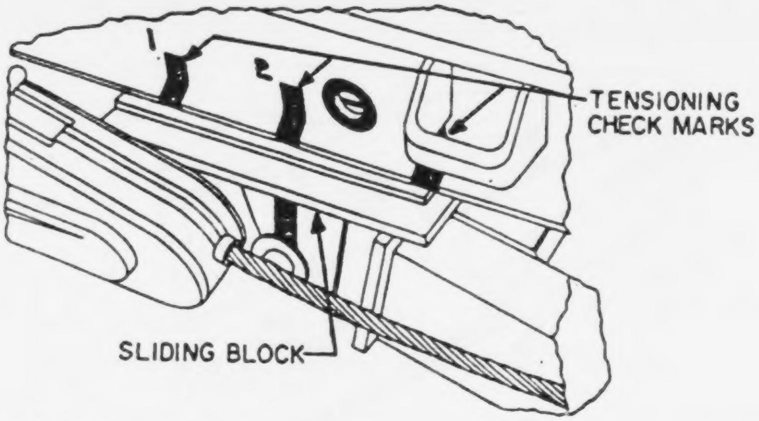
(b) Have tensioning crews prepare pullers for operation by taking up slack by hand, engaging jaw clamps, setting gear change control into low gear, and putting the handle over the rear spigot.


GEAR CHANGE PLUNGER (RAISE TO CHANGE GEARS)
REAR SPIGOT (TO TAKE IN)
FRONT SPIGOT (TO PAY OUT)
JAW CLAMP (OPEN ←
→ CLOSED)
GEAR CHANGE CONTROL
(ROTATE TO HIGH OR LOW AS NEEDED)
CABLE ORIFICE

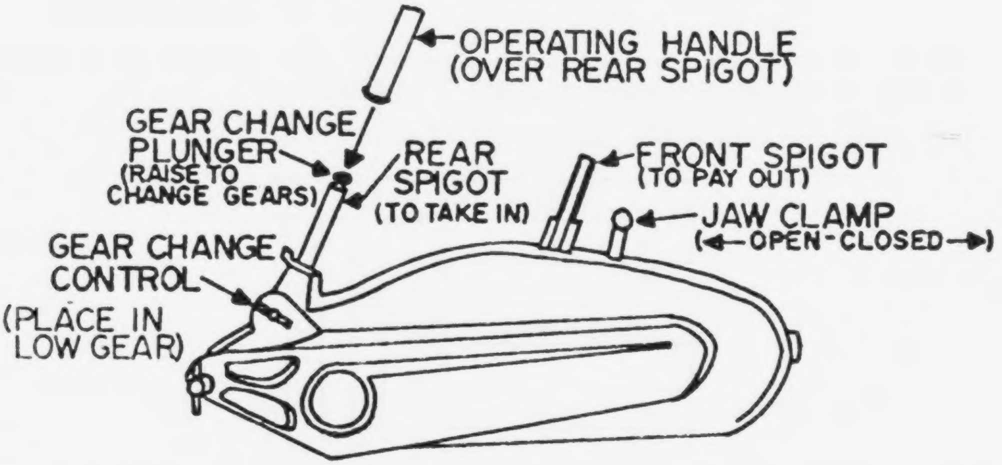
(c) Ensure that all sliding blocks are at the same check point on each tensioning post. If not, have that puller operated slowly until it is at the position as all the others.

2-11. ASSEMBLY (Continued)

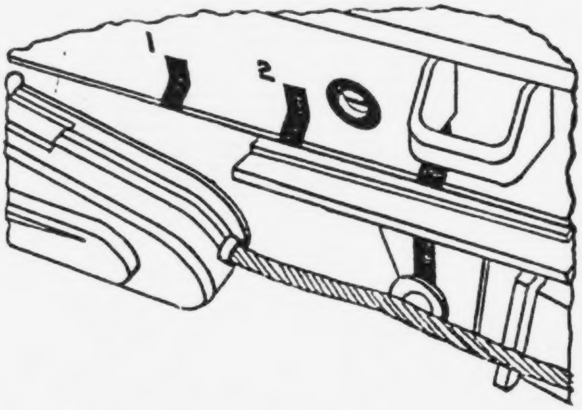
Step 2.a. Assembly Procedures (Continued).


1
2
TENSIONING CHECK MARKS
SLIDING BLOCK

(d) With all sliding blocks at the same check points, begin operating cable pullers to tension link chain on both sides of bridge.


OPERATING HANDLE (OVER REAR SPIGOT)
GEAR CHANGE PLUNGER (RAISE TO CHANGE GEARS)
REAR SPIGOT (TO TAKE IN)
FRONT SPIGOT (TO PAY OUT)
JAW CLAMP (◄-OPEN-CLOSED-►)
GEAR CHANGE CONTROL (PLACE IN LOW GEAR)

(e) Tension link chain until next check point is reached. All sliding blocks must reach check point together, before operating pullers to the next check point.

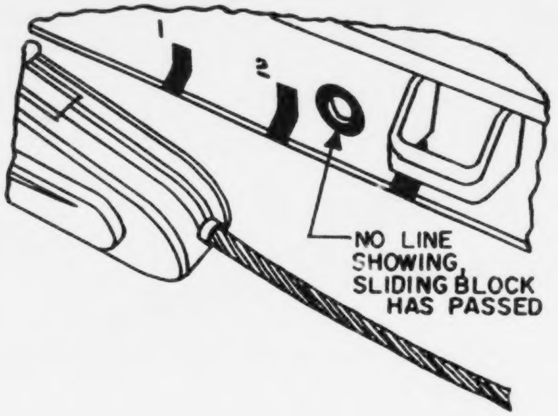


best copy available

2-11. ASSEMBLY (Continued)

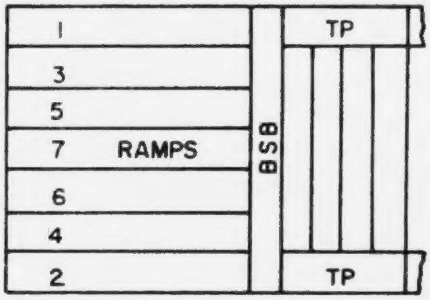
Step 2.a. Assembly Procedures (Continued).

(f) Repeat (e) until sliding block has passed the pin hole in frame. Put nose pin through hole and secure with retainer clip.


1
2
NO LINE SHOWING, SLIDING BLOCK HAS PASSED

(g) Operate pullers to slacken puller cables. Place handle in well of a bottom panel for later use. Link chain on this side of bridge is tensioned.

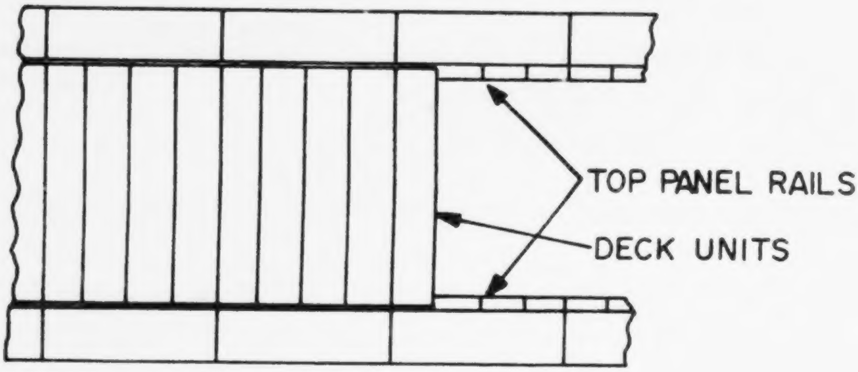
134 Hook outside ramp units on near bank bankseat beam.


1
3
5
7
RAMPS
6
4
2
BSB
TP
TP

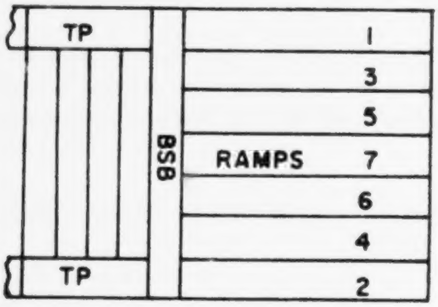
2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

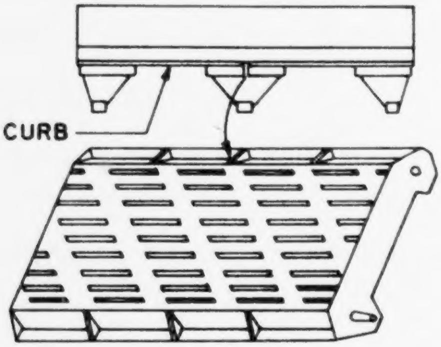
135 Starting on near bank side of bridge, hook deck units on inside top panel rails.


TOP PANEL RAILS
DECK UNITS

136 Put ramp units on far bank end of bridge.


TP
TP
BSB
RAMPS
1
3
5
7
6
4
2

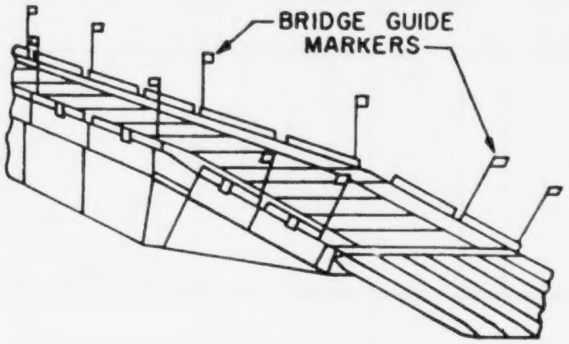
137 Hook all curbs on outside edges of bridge. Start on near bank end of bridge.



2-11. ASSEMBLY (Continued)

Step 2.a. Assembly Procedures (Continued).

138. Put bridge guide markers in place.



NOTE

After bridge has passed inspection, put bridge classification signs in place, then make sure that all erection equipment is away from roadway. The bridge is now ready to use. Only one MLC 60 vehicle is permitted on the bridge at a time.

Anchorage procedures for double story bridges (with or without reinforcement) are located in Chapter 2 of TM 5-5420-212-12 dated April 1985.

2-12. DISASSEMBLY (Continued)

WARNING

Rocking Rollers

Rocking rollers must be in a down or locked position prior to disconnecting the assisting vehicle.

General.

a. Paragraph 2-12 will describe the step by step procedures for the disassembly of all the lengths of Link Reinforced MGB.

b. The disassembly procedures are basically the reverse of assembly but there are differences, REFER TO TABLE 2-13. Because of these differences the user is advised to follow the step by step procedures carefully.

c. Once the user becomes familiar with the step by step procedures of disassembly, it will be possible to disassemble any link reinforced bridge by using the De-launch Table 2-14.

d. This table provides the necessary instructions to disassemble and de-launch all bridges.

e. DO NOT TRY TO USE THIS TABLE UNTIL THE STEP BY STEP PROCEDURES HAVE BEEN PRACTICED A NUMBER OF TIMES.

EXAMPLE: Disassembling a 2E + 16 bay Link Reinforced MGB.

When constructing a 2E + 16 bay, steps 1.a. and b. are performed. At the end of step 1.b., the user proceeds to step 2.a.(1). The user will perform Steps 2.a.(a) thru 2.a.(13).

At the end of Step 2.a.(13) there are instructions to proceed to another step. The user should continue by going to the next step, which in this case is 2.a.(15). The rule to follow is: Continue performing the steps in the order they are given, unless instructed to proceed to another step.

Following that rule, the user performs Step 2.a.(18), then proceeds to step 2.a.(21).

If the user is in doubt as to the steps to perform, the listing that follows is provided as a quick reference to check the steps used to construct any of the link reinforced bridges.

To use the listing, the user reads down the column of the bridge being disassembled and performs the steps in the order listed.

2-12. DISASSEMBLY (Continued)

Using the example of the 2E + 16 bay bridge, the user should perform steps:

1.a. and b.
2.a(1) thru (13)
(15) thru (18)
(21) thru (45)
(51) thru (54)
(63) and (64)
(67) and (68)
(72) thru (76)
(79) and (80)
(87) thru (93)
(95) thru (99)
(101) thru (103)
(105) thru (107)
(109)
(111) thru (115)
(117) thru (133)

Table 2-13. Required Steps Per Bridge Length

2E + 13 bay	2E + 14 bay	2E + 15 bay	2E + 16 bay	2E + 17 bay
Perform Steps 1.a. and b.	Perform Steps 1.a. and b.	Perform Steps 1.a. and b.	Perform Steps 1.a. and b.	Perform Steps 1.a. and b.
2.a.(1) thru (18) (21) thru (45) (51) thru (54) (59) thru (64) (87) thru (93) (98) and (99) (101) thru (103) (105) thru (107) (109) (112) thru (115) (117) thru (133)	2.a.(1) thru (18) (21) thru (45) (51) thru (54) (63) thru (66) (79) and (80) (87) thru (93) (97) thru (99) (101) thru (103) (105) thru (107) (109) (112) thru (115) (117) thru (133)	2.a.(1) thru (18) (21) thru (45) (51) thru (54) (59) and (60) (63) and (64) (74) thru (76) (79) and (80) (87) thru (93) (96) thru (99) (101) thru (103) (105) thru (115) (109) (112) thru (115) (117) thru (133)	2.a.(1) thru (13) (15) thru (18) (21) thru (45) (51) thru (54) (63) and (64) (67) and (68) (72) thru (76) (79) and (80) (87) thru (93) (95) thru (99) (101) thru (103) (105) thru (107) (109) (111) thru (115) (117) thru (133)	2.a.(1) thru (13) (15) thru (18) (21) thru (45) (48) thru (54) (63) and (64) (67) and (68) (72) thru (76) (79) and (80) (87) thru (99) (101) thru (103) (105) thru (107) (109) (111) thru (115) (117) thru (133)

2-12. DISASSEMBLY (Continued)

Table 2-13. Required Steps Per Bridge Length — Continued

2E + 18 bay	2E + 19 bay	2E + 20 bay	2E + 21 bay	2E + 22 bay
Perform Steps 1.a. and b.	Perform Steps 1.a. and b.	Perform Steps 1.a. and b.	Perform Steps 1.a. and b.	Perform Steps 1.a. and b.
2.a.(1) thru (13) (15) thru (17) (19) (21) thru (26) (28) thru (44) (51) thru (58) (63) and (64) (69) and (70) (74) thru (76) (79) thru (81) (86) thru (91) (94) thru (97) (99) thru (101) (103) thru (105) (107) thru (110) (114) thru (133)	2.a.(1) thru (13) (15) thru (17) (19) thru (44) (51) thru (61) (63) and (64) (69) thru (71) (74) thru (80) (85) thru (91) (94) thru (97) (99) thru (101) (103) thru (105) (107) thru (110) (114) thru (133)	2.a.(1) thru (13) (15) thru (17) (19) thru (44) (51) thru (58) (63) and (64) (67) (69) and (70) (74) thru (80) (84) thru (91) (94) thru (97) (99) thru (101) (103) thru (105) (107) thru (110) (114) thru (133)	2.a.(1) thru (13) (15) thru (17) (19) thru (26) (28) thru (44) (46) thru (52) (54) thru (58) (63) and (64) (67) (69) thru (76) (79) and (80) (83) thru (91) (94) thru (97) (99) thru (101) (103) thru (105) (107) thru (110) (114) thru (133)	2.a.(1) thru (13) (15) thru (17) (19) thru (44) (46) and (47) (49) thru (55) (57) and (58) (63) and (64) (67) thru (76) (79) and (80) (82) thru (91) (94) thru (97) (99) thru (101) (103) thru 105 (107) thru (110) (114) thru (133)

2-12. DISASSEMBLY (Continued)

Table 2-14. De-Launch Table

BRIDGE ft LENGTH m	109 33.2	115 35.1	121 36.9	127 38.7	133 40.5
2E + NO of BAYS	13	14	15	16	17
NOSE CONSTRUCTION	7N1	7N1	7N1	8N1	8N1
DELAUNCH TO ADD REMOVE	Dp2 3N1 AA(L)	Dp2 3N1 AA(L)	Dp2 3N1 AA(L)	Dp2 4N1 AA(L)	Dp2 4N1 AA(L)
DELAUNCH TO REPOSITION REMOVE	13p2 LRP AA(S)	14p2 LRP AA(S)	15p2 LRP AA(S)	16p2 LRP AA(S)	17p2 LRP AA(S)
DELAUNCH TO ADD ADD REMOVE	12p2 FRB 2N1 AA	13p2 FRB 2N2 AA	14p2 FRB 2N1&1N1 AA	15p2 FRB 3N1 AA	16p2 FRB 3N1 AA
DELAUNCH TO REMOVE PT from ADD ADD REMOVE	10p6 9&1LL RRB 1N1 LT-10p1	11p6 10&1LL RRB 1N1 LT-11-1	12p6 11&1LL RRB LLN-R LT-12p1	13p6 12&1LL RRB 2N1 LT-13p1	14p6 13&1LL RRB 2N1 LT-14p1
DELAUNCH TO ADD REMOVE					12p4 1N1&LLN-R LT-11p7-1LL
DELAUNCH TO ADD REMOVE REMOVE	8p4 LLN-R LT-7p7 1LL	9p4 LLN-R-F LT-8p7 1LL	10p4 LLN-F LT-9p7 1LL	11p4 1N1&LLN-R LT-10p7 1LL	10p4 LT-9p7 1LL
DELAUNCH TO REMOVE REMOVE REMOVE ADD	7p4 LT-6p7 AF-7p1 1SL LLN-F	7p4 LT-6p7 AF-7p1 1LL	8p4 LT-7p7 AF-8p1 1SL	9p4 LT-8p7 AF-9p1 1LL LLN-F	9p4 LT-8p7 AF-9p1 1SL LLN-F
DELAUNCH TO REMOVE REMOVE REMOVE	6p2 LT-4p7 1LL PT		7p4 LT-6p7		
DELAUNCH TO RECOVER REMOVE REMOVE	(6p0) LRP	(6p4) LRP 1LL PT	(7p0) LRP	(7p2) LRP LT-6p7 1LL	(7p6) LRP LT-6p7 1LL
BOOM TO REMOVE			14p0 PT&1LL	14p0 PT&1LL	14p0 PT&1LL

2-12. DISASSEMBLY (Continued)

Table 2-14. De-Launch Table - Continued

BOOM TO REMOVE		13p6 LT-4p7	13p0 LT-4p7	12p6 LT-4p7	12p6 LT-4p7
BRIDGE ft LENGTH m	109 33.2	115 35.1	121 36.9	127 38.7	133 40.5
2E + NO. of BAYS	13	14	15	16	17
BOOM TO REMOVE REMOVE	11p0 1LL AA(S)	11p0 1LL AA(S)	11p0 1LL AA(S)	11p0 1LL AA(S)	11p0 1LL AA(S)
	DO NOT DISCONNECT VEHICLE UNTIL AA(L) HAS BEEN REMOVED, WHICH WILL REQUIRE CONTINUING BOOM TO 10p0.				
BOOM TO REMOVE REMOVE	10p0 AA(L) E + 13	10p0 AA(L) E + 14 + 13	10p0 AA(L) E thru 13	10p0 AA(L) E thru 13	10p0 AA(L) E thru 13
BOOM TO ADD (CG)	4p7 12 + 11 + 10 (2p5)	4p7 12 + 11 + 10 (2p5)	4p7 12 + 11 + 10 (2p5)	4p5 12 + 11 + 10 2p3)	4p5 12 + 11 + 10 (2p3)
BOOM TO ADD (CG)	3p0 9 + 8 + 7 (Ap1)	3p0 9 + 8 + 7 (Ap1)	3p0 9 + 8 + 7 (Ap1)	2p7 9 + 8 + 7 (Ap3)	2p7 9 + 8 + 7 (Ap3)
BOOM TO REMOVE REMOVE REMOVE	1p4 (6 + 7N1) + 5 + (4 + 5N1) + 3 + 2 (Bp3) RRB 1 + E	1p4 (6 + 7N1) + 5 + (4 + 5N1) + 3 + 2 (Bp3) RRB 1 + E	1p4 (6 + 7N1) + 5 + (4 + 5N1) + 3 + 2 (Bp3) RRB 1 + E	1p4 (6 + 8N1) + 5 + (4 + 5N1) + 3 + 2 (Bp3) RRB 1 + E	1p4 (6 + 8N1) + 5 + (4 + 5N1) + 3 + 2 (Bp3) RRB 1 + E
BRIDGE ft LENGTH m	139 42.4	145 44.2	151 46.0	157 47.9	163 49.7
2E + NO of BAYS	18	19	20	21	22
NOSE CONSTRUCTION	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2
DELAUNCH TO ADD REMOVE	Dp2 AA(1)	Dp2 5N1 AA(L)	Dp2 5N1 AA(L)	Dp2 AA(L)	Dp2 5N1 AA(L)

2-12. DISASSEMBLY (Continued)

Table 2-14. De-Launch Table — Continued

BRIDGE ft LENGTH m	139 42.4	145 44.2	151 46.0	157 47.9	163 49.7
2E + NO of BAYS	18	19	20	21	22
NOSE CONSTRUCTION	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2	6N1 + 3N2
DELAUNCH TO REPOSITION REMOVE	18p2 LRP AA(S)	19p2 LRP AA(S)	20p2 LRP AA(S)	21p2 LRP AA(S)	22p2 LRP AA(S)
DELAUNCH TO ADD ADD REMOVE	17p2 FRB 4N1 + 3N1 AA	18p2 FRB 4N1 + 3N1 AA	19p2 FRB 4N1 + 3N1 AA	20p2 FRB 4N1 AA	21p2 FRB 4N1 AA
DELAUNCH TO ADD REMOVE PT from ADD REMOVE	15p6 2N1 14&1LL RRB LT-15p1	16p6 2N1 15&1LL RRB LT-16p1	17p6 2N1 16&1LL RRB LT-16p1	18p6 3N1 17&1LL RRB LT-18p1	19p6 3N1 18&1LL RRB LT-19p1
DELAUNCH TO ADD REMOVE	13p4 1N1 LT-12p7	14p4 1N1 LT-13p7	15p4 1N1 LT-14p7	16p4 2N1&1N1 LT-15p7	17p4 2N1&1N1 LT-16p7
DELAUNCH TO REMOVE				15p0 27D	
DELAUNCH TO REMOVE REMOVE REMOVE				14p4 LT-13p7 1LL	15p0 LT-14p7 1LL 37D
DELAUNCH REMOVE REMOVE ADD	11p4 LT-10p7 1LL LLN-R	12p4 LT-11p7 1LL LLN-R	13p4 LT-12p7 1LL LLN-R	12p4 LT-11p7 LLN-R	13p4 LT-12p7 1LL LLN-R&F
DELAUNCH TO REMOVE REMOVE REMOVE ADD	9p4 LT-8p7 AF-9p1 1LL LLN-F	10p4 LT-9p7 AF-10p1 1LL LLN-F	11p4 LT-10p7 AF-11p1 1LL LLN-F	11p4 LT-10p7 AF-11p1 1LL LLN-F	11p4 LT-10p7 AF-11p1 1LL
DELAUNCH TO REMOVE REMOVE		9p4 LT-8p7 1SL			
DELAUNCH TO RECOVER REMOVE REMOVE	(8p0) LRP	(8p5) LRP	(9p6) LRP LT-8p7	(9p4) LRP LT-8p7	(10p0) LRP LT-8p7 1LL

2-12. DISASSEMBLY (Continued)

Table 2-14. De-Launch Table — Continued

BRIDGE ft LENGTH m	139 42.4	145 44.2	151 46.0	157 47.9	163 49.7
2E + NO of BAYS	18	19	20	21	22
BOOM TO REMOVE REMOVE REMOVE (CG)	15p0 LT-6p7 (8p0)	15p0 LT-6p7 1LL (8p5)	15p0 LT-6p7 (9p6)	15p0 LT-6p7 1SL E + 3D (8p0)	15p4 LT-6p7 1LL 3 + 3D (8p4)
BOOM TO REMOVE REMOVE (CG)	14p0 PT&1LL (7p7)	14p0 E + 8D PT&1LL (7p0)	14p0 E + 20D PT&1LL (7p4)	14p0 PT&1LL (8p0)	14p0 PT&1LL (8p4)
BOOM TO REMOVE REMOVE (CG)	13p0 LT-4p7 E + 18 (6p0)	13p0 LT-4p7 19 + 18 (6p0)	13p0 LT-4p7 20 + 19 + 18 (6p0)	13p0 LT-4p7 21 thru 18 (6p0)	13p0 LT-4p7 22 thru 18 (6p0)
BOOM TO REMOVE REMOVE	11p0 1LL AA(S)	11p0 1LL AA(S)	11p0 1LL AA(S)	11p0 1LL AA(S)	11p0 1LL AA(S)
DO NOT DISCONNECT VEHICLE UNTIL AA(L) HAS BEEN REMOVED, WHICH WILL REQUIRE CONTINUING BOOM TO 10p0.					
BOOM TO REMOVE REMOVE (CG)	10p0 AA(L) 17 thru 14 (4p0)	10p0 AA(L) 17 thru 14 (4p0)	10p0 AA(L) 17 thru 14 (4p0)	10p0 AA(L) 17 thru 14 (4p0)	10p0 AA(L) 17 thru 14 (4p0)
BOOM TO REMOVE CG)	4p5 13 + 12 + 11 (2p3)	4p5 13 + 12 + 11 (2p3)	4p5 13 + 12 + 11 (2p3)	4p5 13 + 12 + 11 (2p3)	4p5 13 + 12 + 11 (2p3)
BOOM TO REMOVE (CG)	2p7 10 + 9 + 8 (Ap2)	2p7 10 + 9 + 8 (Ap2)	2p7 10 + 9 + 8 (Ap2)	2p7 10 + 9 + 8 (Ap2)	2p7 10 + 9 + 8 (Ap2)
BOOM TO REMOVE	1p4 7 + (6 + 3N2) + 5 + (4 + 6N1) + 3 + 2 (Bp3)	1p4 7 + (6 + 3N2) + 5 + (4 + 6N1) + 3 + 2 (Bp3)	1p4 7 + (6 + 3N2) + 5 + (4 + 6N1) + 3 + 2 (Bp3)	1p4 7 + (6 + 3N2) + 5 + (4 + 6N1) + 3 + 2 (Bp3)	1p4 7 + (6 + 3N2) + 5 + (4 + 6N1) + 3 + 2 (Bp3)
REMOVE	RRB	RRB	RRB	RRB	RRB
REMOVE	1 + E	1 + E	1 + E	1 + E	1 + E

ABBREVIATIONS AND TERMS USED IN TABLE.

AA = Anchor Assembly

AA(L) = Anchor Assembly (the long link of the assembly)

AA(S) = Anchor Assembly (the short link of the assembly)

AF = Anti-flutter Tackle

CG = Center of Gravity

CRB = Capsill Roller Beam

E = End of Bridge

FRB = Front Roller Beam

LLN = Light Launching Nose

LRB = Launching Roller Beam

LT = Light Tackle

LZ = Landing Zone

PT = Post Tensioning Assembly

RRB = Rear Roller Bearm

1LL = 1 Long Link

1SL = 1 Short Link

6N1, 7N1, and 8N1 = Types of single story nose construction. The first number indicates the number of heavy nose sections used. N1 means nose single story.

6N1 + 3N2 = Type of double story nose construction. 6N1 is explained above. 3N2 means three heavy nose sections used in second story. N2 means nose double story.

2 + 3 + or 8 thru 10 = Describes number of bays to be removed. 2 + 3 +, add 2nd and 3rd bay. 8 thru 10, add bays 8 thru 10.

Boom to = Movement of bridge until the panel point given is over the RRB.

De-launch to = Movement of bridge until the panel point given is over the LRB/CRB.

3D, 8D, 20D, 27D, 30D, 37D, and 40D = Counterweight codes giving the number of deck units required.

(4p0), (2p4), and (Bp3) = Examples of the way that the center of gravity is shown.

2-12. DISASSEMBLY (Continued)

This paragraph provides the steps to disassemble all of the link reinforced MGB on the original near bank. The bridge can be disassembled on the original near or far bank. If the bridge is to be disassembled on the far bank, the erection equipment and launching nose parts must change sides. Procedures for disassembly on the far bank are provided in paragraph 2-13.

Step 1. Preparation for Disassembly.

a. If pumps, hoses and water are available, the bridge, erection and link components should be washed before loading them on the bridge to the washing area, then loaded on the proper pallet.

b. If washing can not be done, the parts are loaded on the proper pallet.

Step 2. Disassembly Procedures.

a. Steps needed to disassemble the bridge are as follows:

1 Remove bridge classification signs.

2 Remove bridge guide markers.

3 Remove all curbs.

4 Remove all ramp units on far bank.

NOTE

Releasing tension on link chain is completed on both sides of bridge at one time.

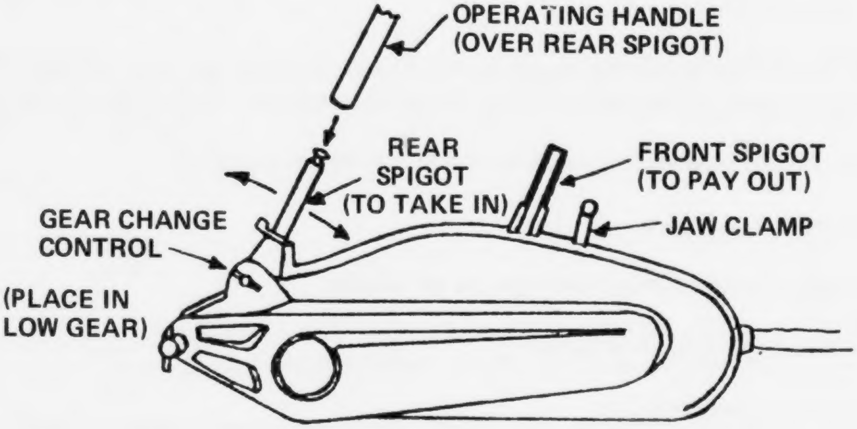
5 Releasing tension on link chain.

(a) Position two persons on each footwalk to operate cable puller to release tension on link chain.

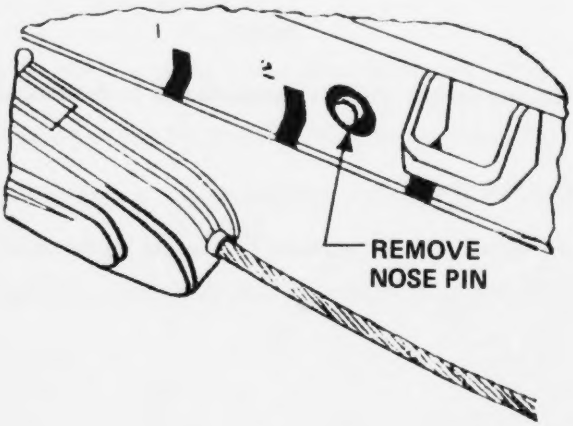
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

(b) Have crews prepare cable pullers for operation by engaging jaw clamps, setting gear change jaw clamps, setting gear change control to low gear, and putting handle over the rear spigot.


OPERATING HANDLE
(OVER REAR SPIGOT)
REAR
SPIGOT
(TO TAKE IN)
FRONT SPIGOT
(TO PAY OUT)
GEAR CHANGE
CONTROL
JAW CLAMP
(PLACE IN
LOW GEAR)

(c) Operate pullers to pull sliding block away from nose pin so the pin can be removed.

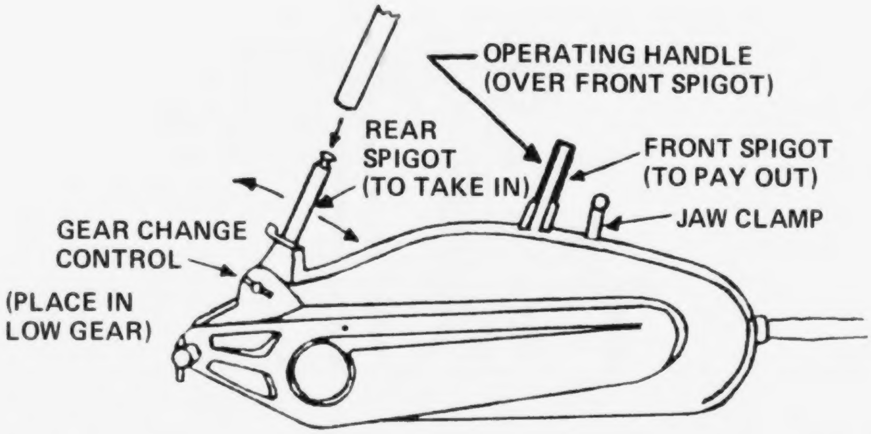

REMOVE
NOSE PIN

(d) Remove retainer clip and nose pin from frame.

2-12. DISASSEMBLY (Continued)

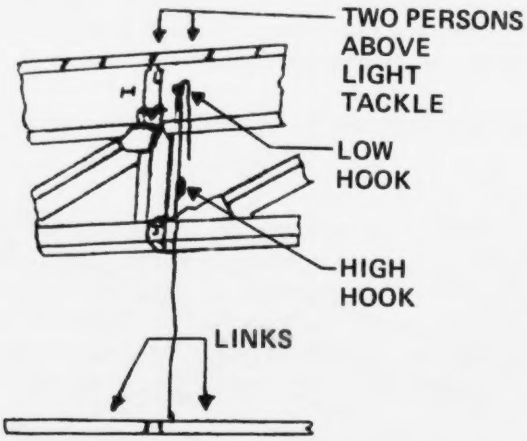
Step 2.a. Disassembly Procedures (Continued).

(e) Put puller handle on front spigot.


OPERATING HANDLE (OVER FRONT SPIGOT)
REAR SPIGOT (TO TAKE IN)
FRONT SPIGOT (TO PAY OUT)
JAW CLAMP
GEAR CHANGE CONTROL
(PLACE IN LOW GEAR)

(f) Operate puller to allow cable to pay out, sliding block will move away from pulley end of post tensioning assembly until link chain is slack under bridge.

(g) Position two persons on girder above each light tackle.


TWO PERSONS ABOVE LIGHT TACKLE
LOW HOOK
HIGH HOOK
LINKS

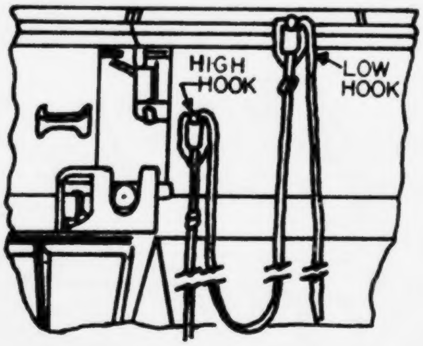
NOTE

Raising link chain is done on one side of bridge at a time.

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

(h) Two persons will lift the light tackle until the high hook can be hooked into the carrying bar bracket of the top panel. Ensure that this lift is made all at one time.



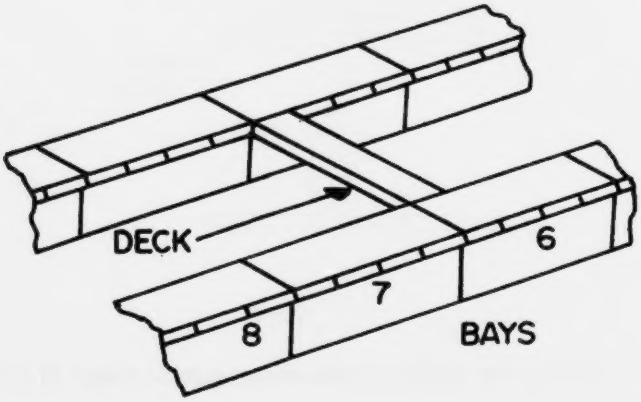
(i) Repeat (g) and (h) to raise link chain on other side of bridge.

NOTE

If deck unit counterweights were used to construct the bridge, the number required must be left in place until moved later.

6 Remove deck units, starting on the far bank end of bridge. Leave deck units in the last recess of bay 1 and 7. Also, leave one deck unit in the last recess of the next to last bay, and one in the sixth bay from the end of bridge (near bank).

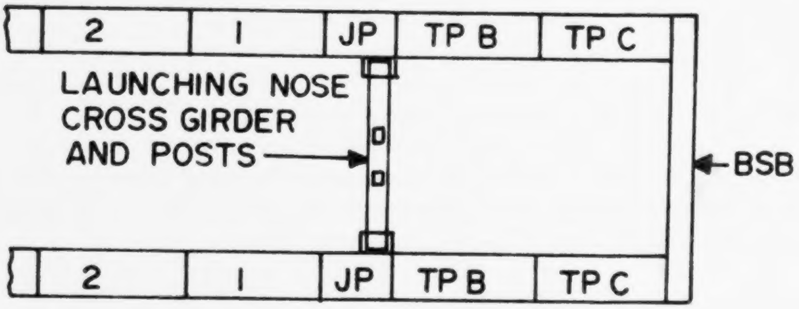
EXAMPLE: 2E + 22 Bay Deck units will be left in the last recess of bays 1, 7, 17 and 21.



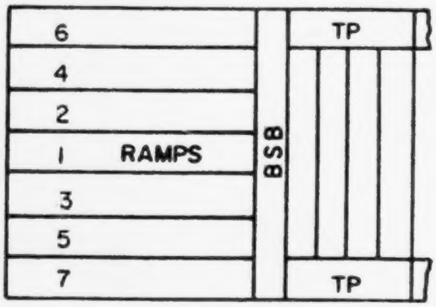
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

7 Install launching nose cross girder (LNCG) and posts on far bank junction panel:


2
1
JP
TP B
TP C
LAUNCHING NOSE CROSS GIRDER AND POSTS
BSB
2
1
JP
TP B
TP C

8 Remove ramp units from near bank end of bridge.


6
4
2
1
RAMPS
3
5
7
BSB
TP
TP

NOTE

There are three methods of raising the near bank end of bridge to install the jacking roller beam (JRB). The first employs the standard hydraulic jacks and jack posts. The second is using the davit posts and jacking brackets. The third is using a crane if one is available. The procedures for the first begin at Step 2.a.(9), the second at Step 2.a. 10 and the third at Step 2.a.(11). The method used depends on the availability of equipment.

PROCEED TO STEP FOR METHOD CHOSEN.

2-12. DISASSEMBLY (Continued)

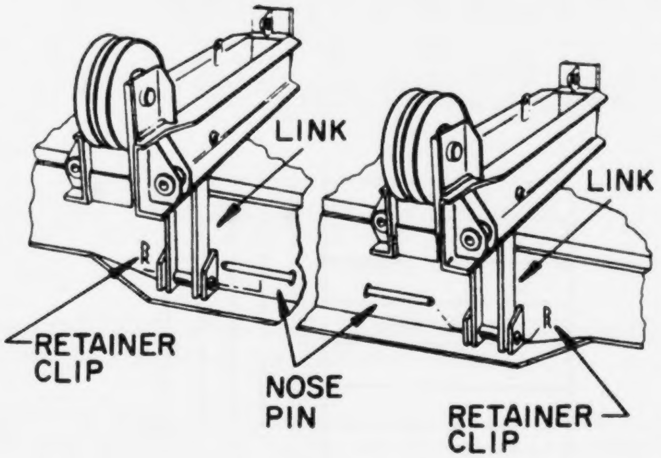
Step 2.a. Disassembly Procedures (Continued).

9 Raise bridge using hydraulic jacks and jack posts in the same way as is done when disassembling bridges 2E + 12 bays and under.

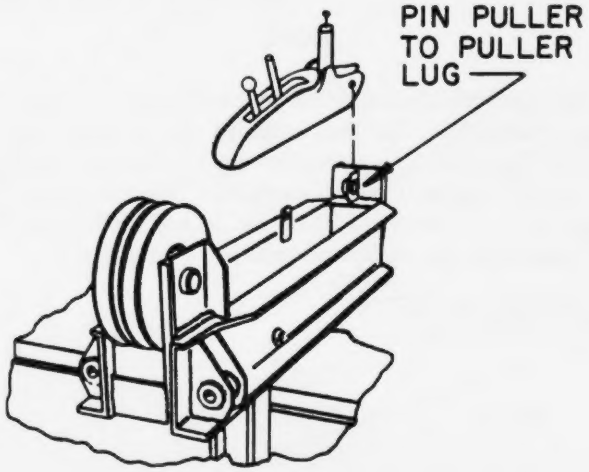
PROCEED TO STEP 2.a. 12.

10 To raise bridge using davit posts and jacking brackets:

(a) Unpin jacking bracket link from the stowed position and place bracket on BSB and deck. Position bracket over jack post bracket and pin link to BSB. Pin link to BSB with a nose pin and secure with a retainer clip.


LINK
LINK
RETAINER CLIP
NOSE PIN
RETAINER CLIP

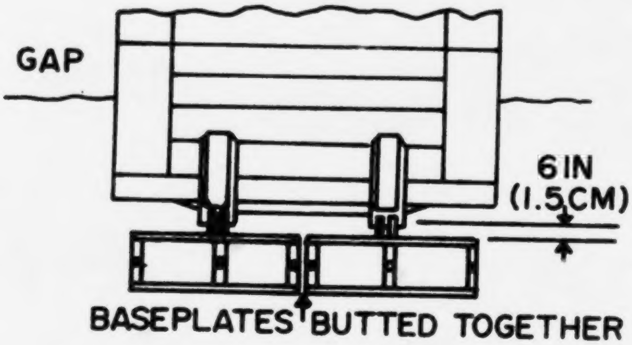
(b) Pin cable pullers in place in jacking bracket.


PIN PULLER TO PULLER LUG

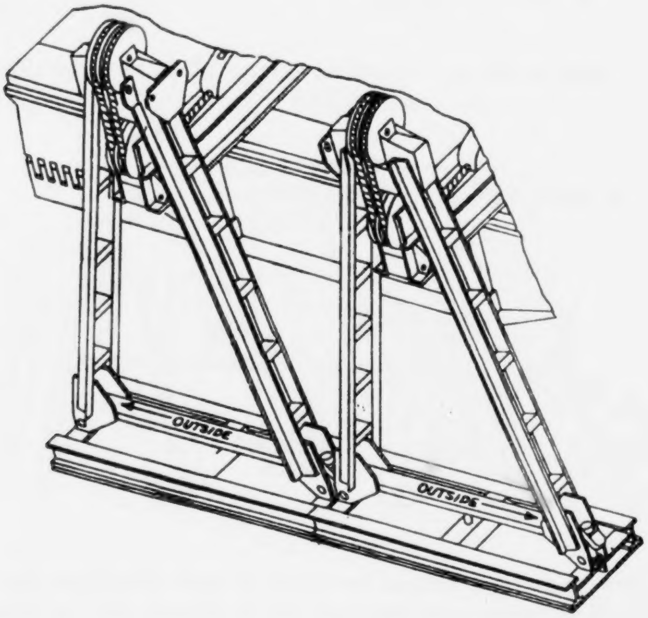
2-12. DISASSEMBLY (Continued)

Step 2.a Disassembly Procedures (Continued).

(c) Place two adjustable support baseplates close to the BSB. Ends of baseplates butt together at centerline.


GAP
6 IN
(1.5 CM)
BASEPLATES BUTTED TOGETHER

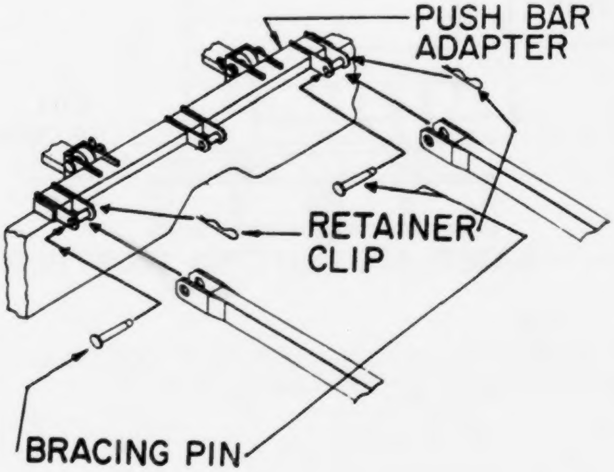
(d) Place one davit upright on each baseplate with arrows pointing to outside of bridge. Reeve puller cables and pin terminals to lugs on jacking brackets.


OUTSIDE
OUTSIDE

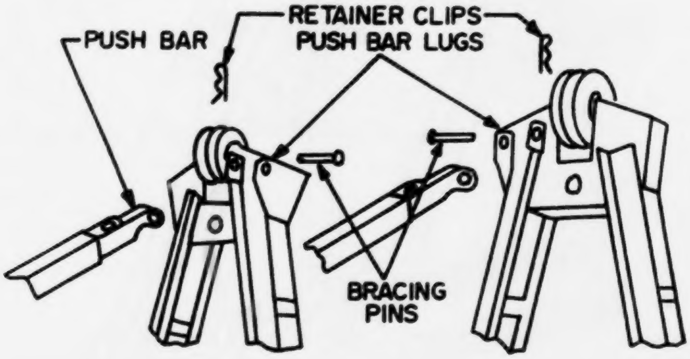
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

(e) Position vehicle near end of bridge. Ensure that truck is straight with bridge and centered over the centerline. Attach 2 push bars (short or long) to adapter on truck. End of push bar is attached to the outside brackets of adapter.


PUSH BAR
ADAPTER
RETAINER
CLIP
BRACING PIN

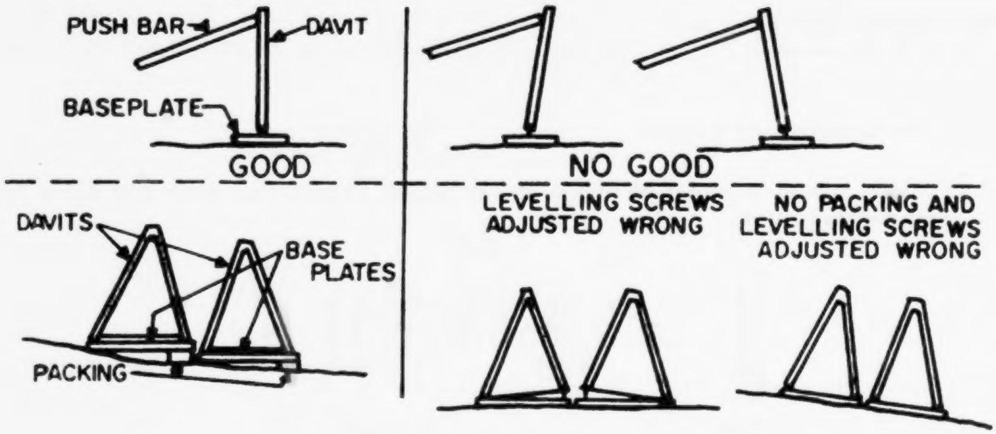
(f) Move truck forward slowly guiding swivel ends of push bars into lugs on davit posts. Pin with bracing pins and secure with retainer clips.


RETAINER CLIPS
PUSH BAR
PUSH BAR LUGS
BRACING
PINS

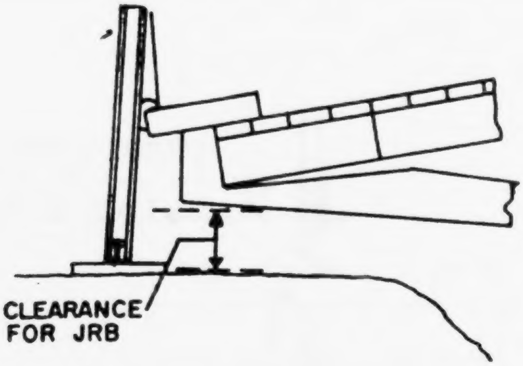
(g) Set davit posts and puller cables vertically in both directions by moving baseplates and truck as necessary. Baseplates may have to be levelled with packing.

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).


PUSH BAR
DAVIT
BASEPLATE
GOOD
NO GOOD
DAVITS
BASE PLATES
PACKING
LEVELLING SCREWS ADJUSTED WRONG
NO PACKING AND LEVELLING SCREWS ADJUSTED WRONG

(h) Lift bridge off of ground with cable puller using 2 men on each puller handle, with handle fully extended. Ensure that the puller cable does not become fouled on the gusset plate. Lift bridge until safety chains can be connected to jacking brackets. Secure chains to bracket. Pay out cable pullers until weight of bridge is taken by safety chains.


CLEARANCE FOR JRB

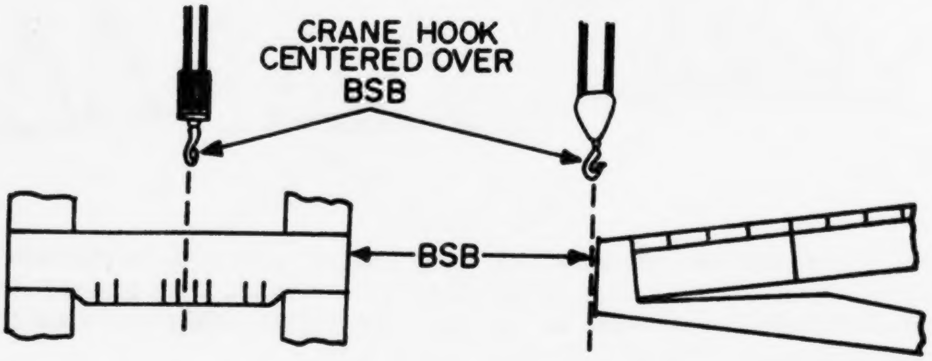
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

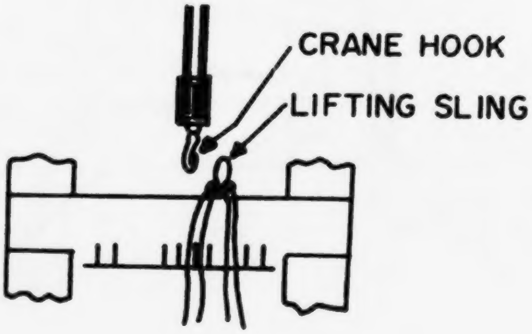
PROCEED TO STEP 2.a. 12.

11 To raise bridge using a crane.

(a) Position crane near rear of bridge on centerline. Ensure that hook and block of crane is centered over BSB.


CRANE HOOK CENTERED OVER BSB
BSB

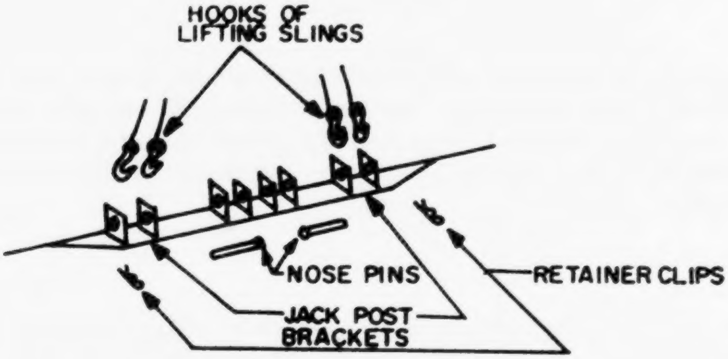
(b) Lower crane hook and attach 4 legged lifting sling. All four legs of sling will be used to lift bridge.


CRANE HOOK
LIFTING SLING

2-12. DISASSEMBLY (Continued)

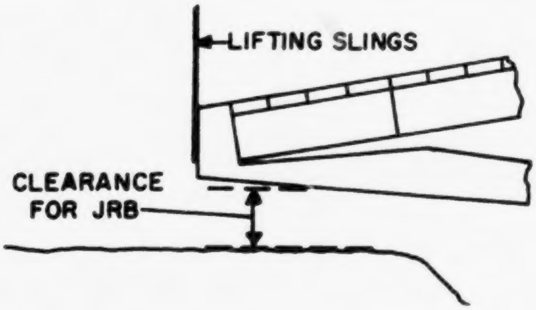
Step 2.a. Disassembly Procedures (Continued).

(c) Place hooks of two legs in each jack post bracket. Tip of hook must face outside of BSB. Pin hooks in with a nose pin and secure with retainer clip.


HOOKS OF LIFTING SLINGS
NOSE PINS
RETAINER CLIPS
JACK POST BRACKETS

(d) Operate crane to take slack from the sling legs. Ensure that cables are not twisted.

(e) Lift bridge slowly and only high enough to allow the JRB to be installed.


LIFTING SLINGS
CLEARANCE FOR JRB

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

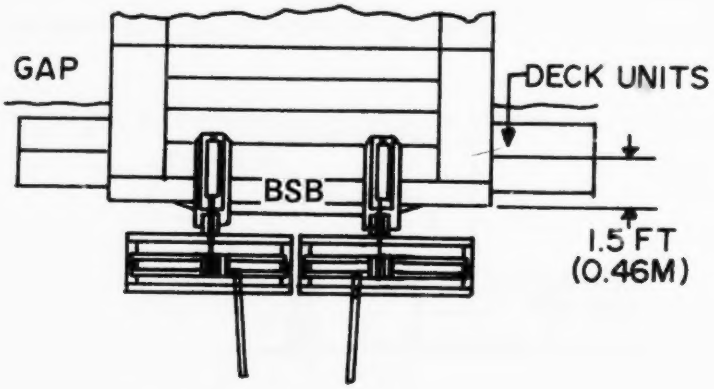
PROCEED TO STEP 2.a. 12.

CAUTION

Do not try to increase the height of packing or number of deck units under the JRB. Increasing the height or number of these items will cause the JRB to be unstable. If site conditions require an increase in the height of the JRB, then long ramps (upside down) or top panels may be used in place of deck units.

12 To install JRB.

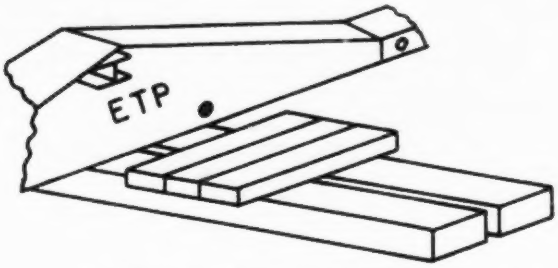
(a) Place two deck units side by side under each ETP. These deck units are placed perpendicular to the bridge centerline, and centered at 1.5 ft (0.46 m) from the outside of the BSB. Deck units must be placed upside down to increase bearing surface.



2-12. DISASSEMBLY (Continued)

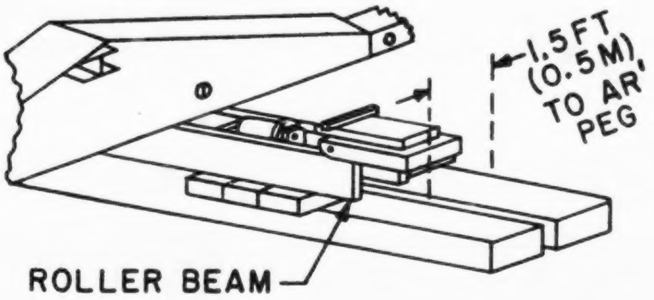
Step 2.a. Disassembly Procedures (Continued).

(b) Place three pieces of packing side by side on deck units. Packing is placed under ETP and parallel to centerline. Packing prevents metal to metal contact which could cause damage or allow the roller beam to slide under the bridge.



3 PIECES OF PACKING PLACED
ON TOP OF DECK UNITS
UNDER ETP

(c) Place a roller beam across the packing until it is centered on the bridge and the 1.5 ft (0.46 m) mark. Ensure that the roller catches are locked.

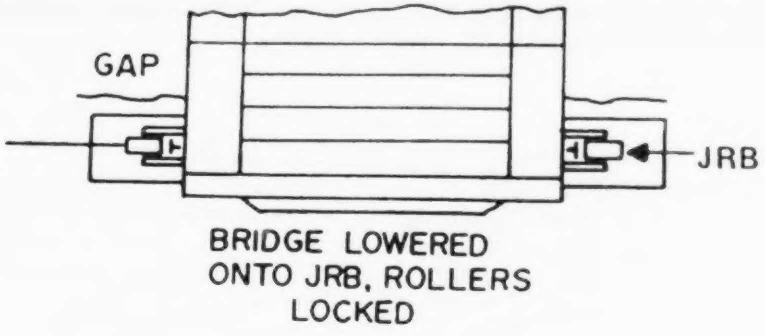


13 Lowering bridge onto the JRB.

(a) If using jacks, operate jacks to lower bridge slowly and evenly until bridge rests on locked rollers of JRB. Remove jacks, jack posts and baseplates from end of bridge.

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

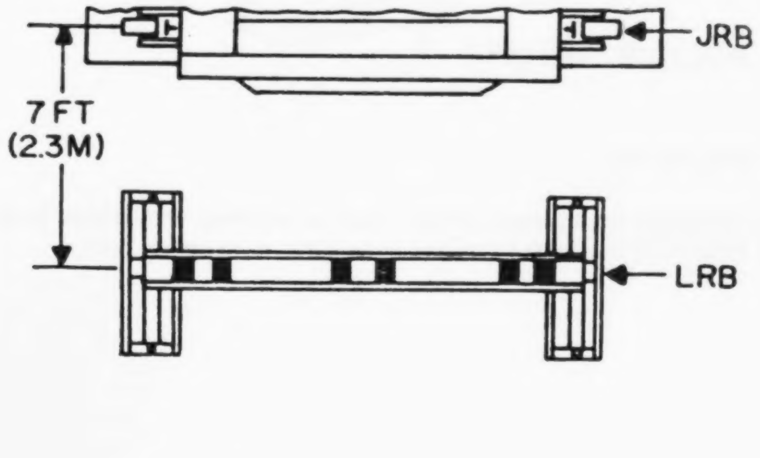


(b) If using davits and jacking brackets, operate pullers to lower bridge slowly and evenly until bridge rests on locked rollers of JRB. Remove davits, brackets and baseplates from end of bridge. Disconnect and move vehicle backward about 25 ft (7.6 m) from end of bridge.

(c) If using crane, operate crane to lower bridge slowly and evenly until bridge rests on locked rollers of JRB. Remove lifting slings from bridge and crane. Move crane off of site.

For 2E + 16 thru 2E + 22 bay bridges, PROCEED TO STEP 2.a. 15 .

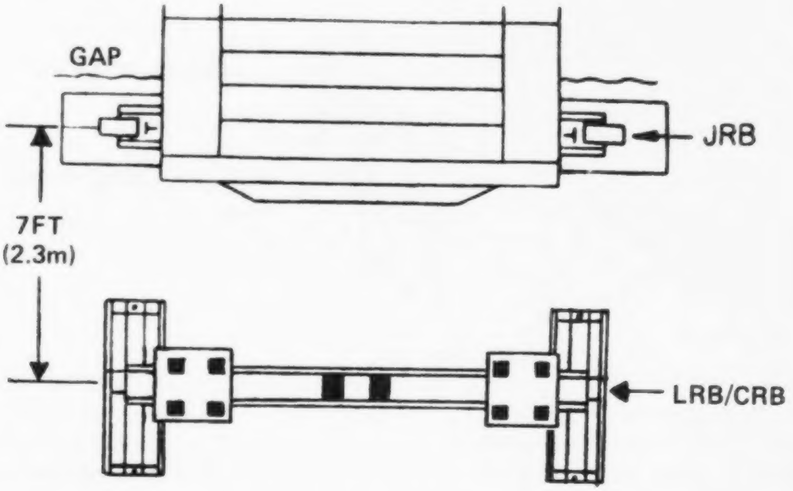
14. Assemble and position the launching roller beam (LRB) over the centerline at 7.5 ft (2.3 m) from the JRB. LRB should be in a height setting that will permit the end of bridge to pass over it during next delaunch.



2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

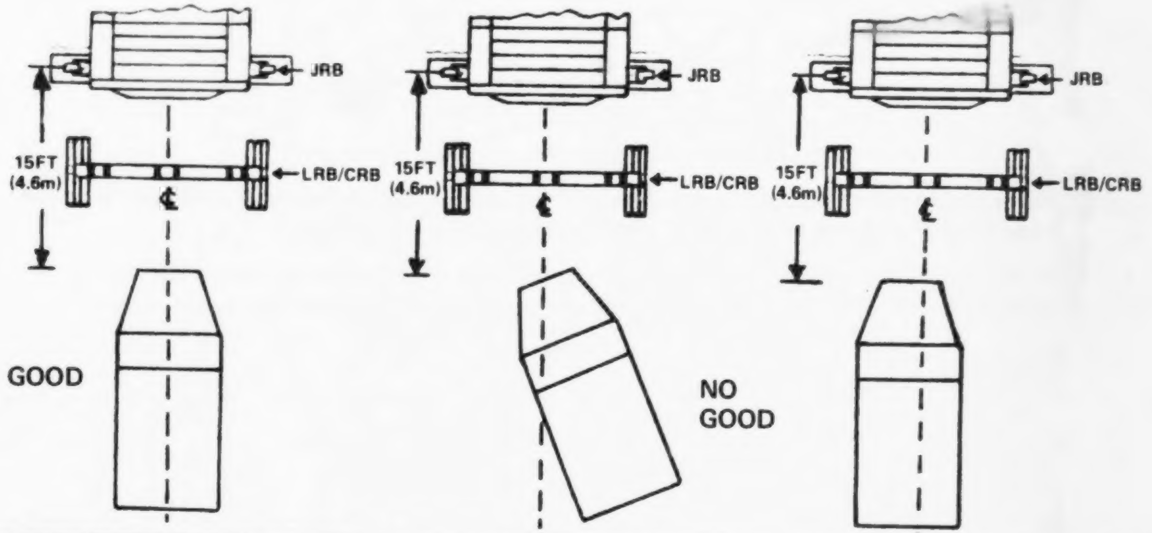
15 Assemble and position the capsill roller beam (CRB) over the centerline at 7.5 ft (2.3 m) from the JRB. CRB should be in a height setting that will permit the end of bridge to pass over it during the next delaunch.


GAP
JRB
7FT
(2.3m)
LRB/CRB

16 Move vehicle into position about 15 ft (4.6 m) from end of bridge.

(a) Ensure vehicle is straight with bridge.

(b) Center vehicle over centerline.


JRB
15FT
(4.6m)
LRB/CRB
℄
GOOD
JRB
15FT
(4.6m)
LRB/CRB
℄
NO
GOOD
JRB
15FT
(4.6m)
LRB/CRB
℄

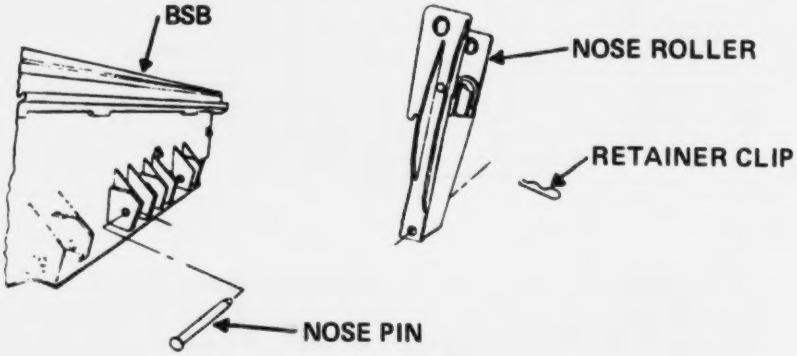
PREPARE TO ASSEMBLE LAUNCHING NOSE. FOR ALL CONFIGURATIONS PROCEED TO STEP 2.a. 17.

2-12. DISASSEMBLY (Continued)

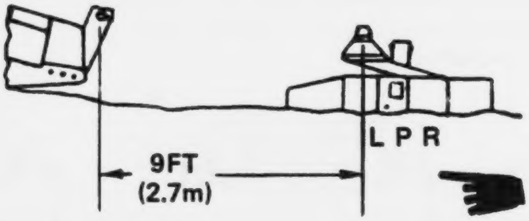
Step 2.a. Disassembly Procedures (Continued).

17 To assemble launching nose:

(a) Pin launching nose roller to far bank BSB with nose pin, and secure with retainer clip.



(b) Place landing roller pedestal (LRP) 9 ft (2.7 m) from BSB. This distance is measured from nose roller to center of landing roller.

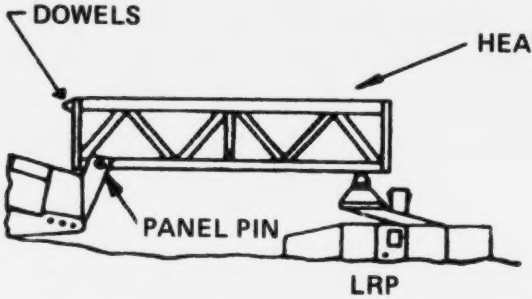


(c) Place partly raised [about 6 in (15.0 cm)] 20 ton jack in the LRP. Ensure that jack is seated in base of LRP and that the hood of LRP is on head of jack correctly.

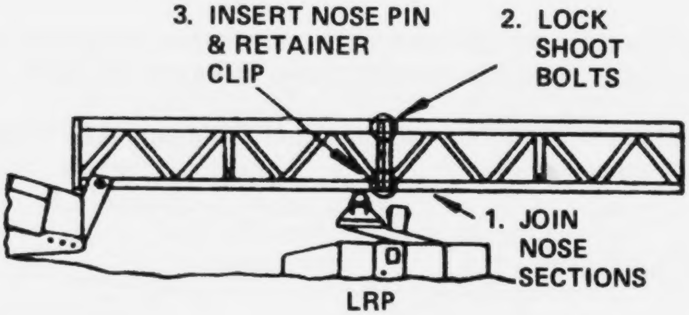
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

(d) Place first heavy nose section on nose roller and LRP. Dowel end of nose section faces cross girder. Place a panel pin through the nose roller and nose section.


DOWELS
HEAVY NOSE SECTION
PANEL PIN
LRP

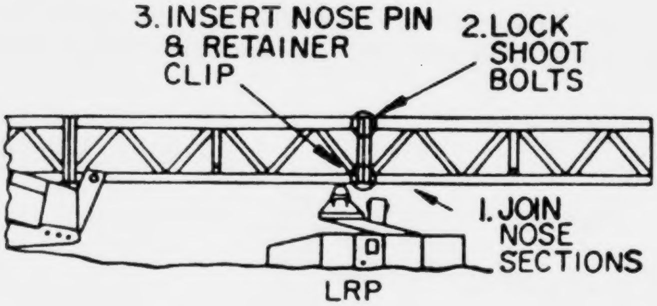
(e) Connect and pin second heavy nose section to first section. Remove the panel pin from the nose roller and move the nose toward the LNCG. Stop movement when the junction of the two nose sections is within 1 ft (0.3 m) of the nose roller. Place a panel pin through the nose roller and nose section.


3. INSERT NOSE PIN & RETAINER CLIP
2. LOCK SHOOT BOLTS
1. JOIN NOSE SECTIONS
LRP

(f) Connect and pin third heavy nose section to first section. Remove the panel pin from the nose roller and move the nose toward the LNCG. Nose has to be guided into rollers of LNCG.

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).


3. INSERT NOSE PIN & RETAINER CLIP
2. LOCK SHOOT BOLTS
1. JOIN NOSE SECTIONS
LRP

For 2E + 13 thru 2E + 17 bay bridges, PROCEED TO STEP 2.a. 18 .

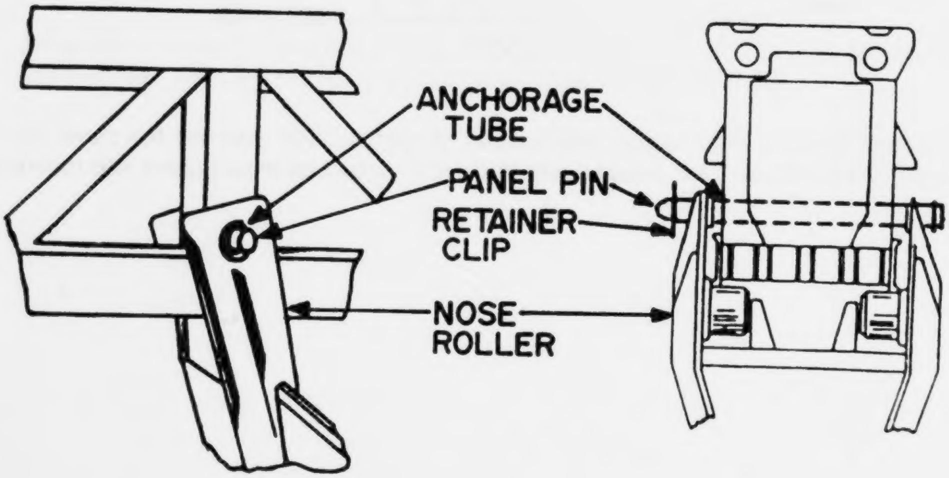
For 2E + 18 thru 2E + 22 bay bridges, PROCEED TO STEP 2.a. 19 .

18. To complete a single story nose.

NOTE

Though procedures are provided in this step for the completion of the launching nose, reposition the LRP, if two LRPs are not used.

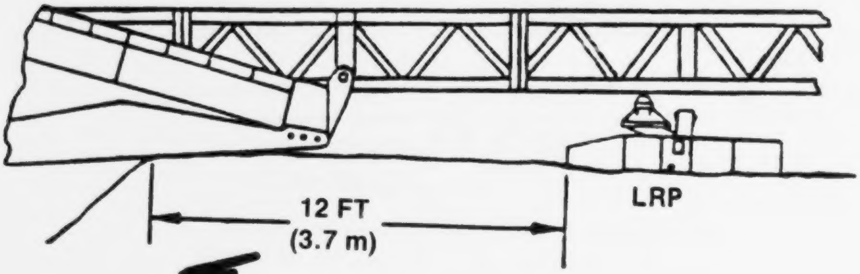
(a) Place a panel pin through the nose roller and anchorage tube of second nose section. Secure with retainer clip.


ANCHORAGE TUBE
PANEL PIN
RETAINER CLIP
NOSE ROLLER

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

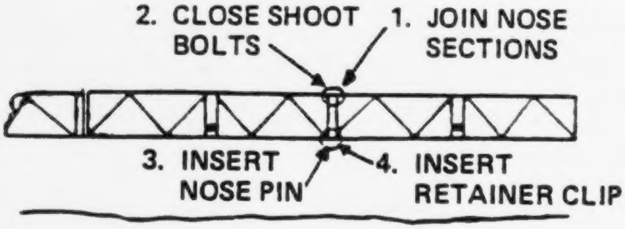
(b) Move the LRP toward the BSB until the base of LRP is 12 ft (3.7 m) from the AR peg.


12 FT
(3.7 m)
LRP

NOTE

The remaining nose sections (heavy and light) may not be put on until delaunch begins. This would be the case if the site conditions were restricted on the far bank. As many nose sections as possible should be put on if site conditions permit.

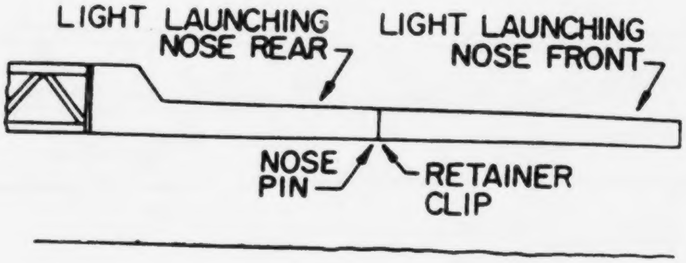
(c) Connect and pin as many heavy nose sections as are needed for the bridge. Do not move the launching nose into the LNCG.


2. CLOSE SHOOT BOLTS
1. JOIN NOSE SECTIONS
3. INSERT NOSE PIN
4. INSERT RETAINER CLIP

(d) Connect and pin light nose rear section to the last heavy nose section. Secure with retainer clip.

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).


LIGHT LAUNCHING NOSE REAR
LIGHT LAUNCHING NOSE FRONT
NOSE PIN
RETAINER CLIP

(e) Connect and pin light nose front section to the light nose rear section. Secure with retainer clip.

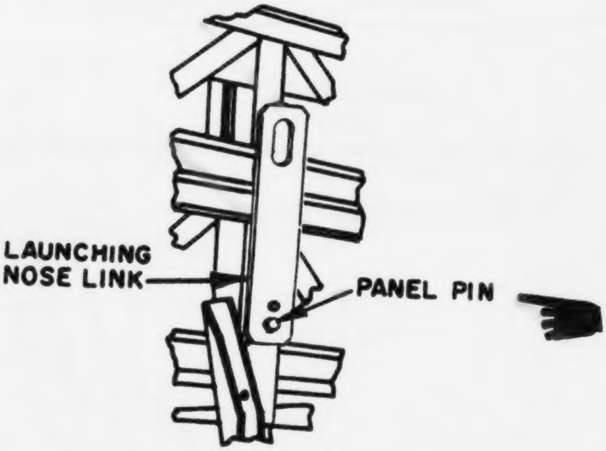
For 2E + 13 thru 2E + 17 bay bridges, PROCEED TO STEP 2.a. 21 .

19. To complete a double story nose.

NOTE

Though procedures are provided in this step for the completion of the launching nose, reposition the LRP, if two LRPs are not used.

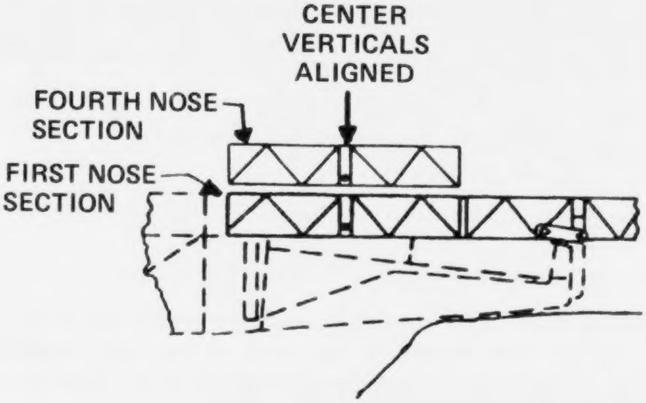
(a) Position launching nose links at nose roller, and pin links with a panel pin. Secure with a retainer clip. Elongated hole in nose links will connect to second story nose section once they are in place.


LAUNCHING NOSE LINK
PANEL PIN

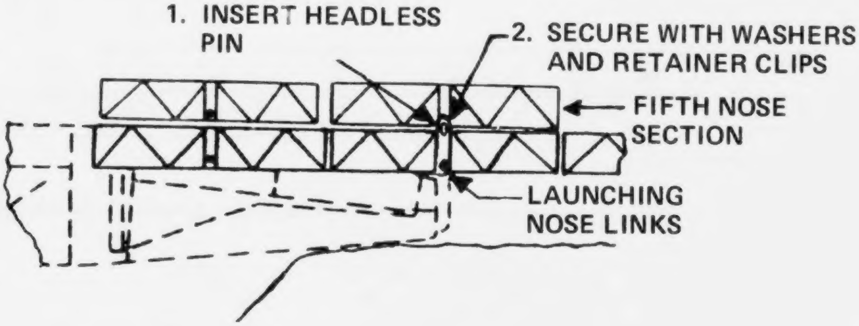
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

(b) Place fourth heavy nose section on top of third section. Slide this nose section toward LNCG over assembled nose. Position fourth nose over the first nose section. The verticals of fourth nose section should be directly over the verticals of the first nose section.


CENTER VERTICALS ALIGNED
FOURTH NOSE SECTION
FIRST NOSE SECTION

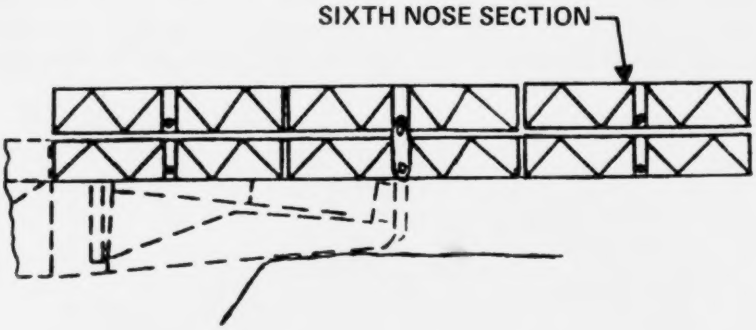
(c) Connect and pin a fifth heavy nose section to the fourth nose section. Align elongated holes of nose links with anchorage tube of fifth nose section and pin with a headless pin. Secure both ends of headless pin with retainer clip.


1. INSERT HEADLESS PIN
2. SECURE WITH WASHERS AND RETAINER CLIPS
FIFTH NOSE SECTION
LAUNCHING NOSE LINKS

(d) Connect and pin a sixth heavy nose section to the fifth nose section. Secure with retainer clip.

2-12. DISASSEMBLY (Continued)

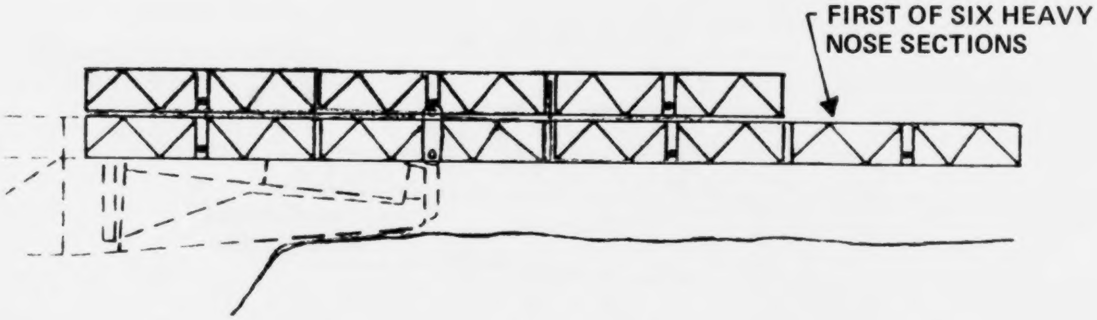
Step 2.a. Disassembly Procedures (Continued).


SIXTH NOSE SECTION

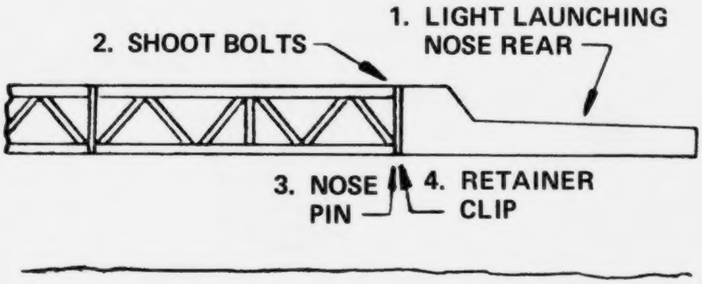
NOTE

The remaining nose sections (heavy and light) may not be put on until delaunch begins. This would be the case if the site conditions were restricted on the far bank. As many nose sections as possible should be put on if site conditions permit.

(e) Connect and pin six heavy nose sections to the third nose section. These six will be the single story part of the double story nose.


FIRST OF SIX HEAVY NOSE SECTIONS

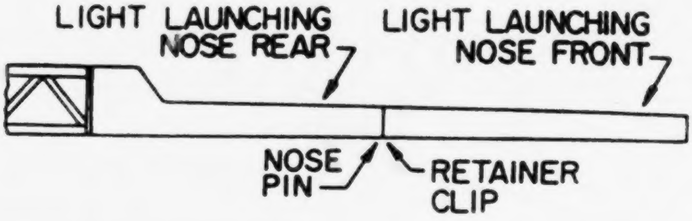
(f) Connect and pin light nose rear section to the last heavy nose section. Secure with retainer clip.


1. LIGHT LAUNCHING NOSE REAR
2. SHOOT BOLTS
3. NOSE PIN
4. RETAINER CLIP

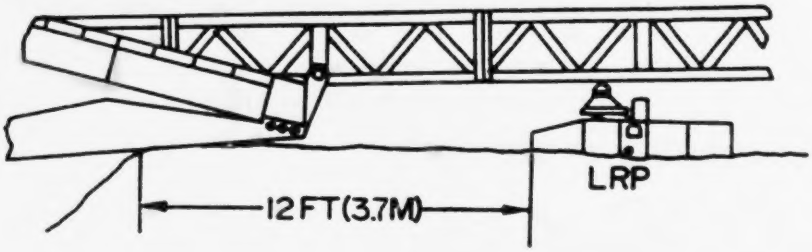
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

(g) Connect and pin light nose front section to the light nose rear section. Secure with retainer clip.


LIGHT LAUNCHING NOSE REAR
LIGHT LAUNCHING NOSE FRONT
NOSE PIN
RETAINER CLIP

(h) Move the LRP toward the BSB until the base of LRP is 12 ft (3.1 m) from the AR peg. Center LRP under launching nose.


LRP
12 FT (3.7M)

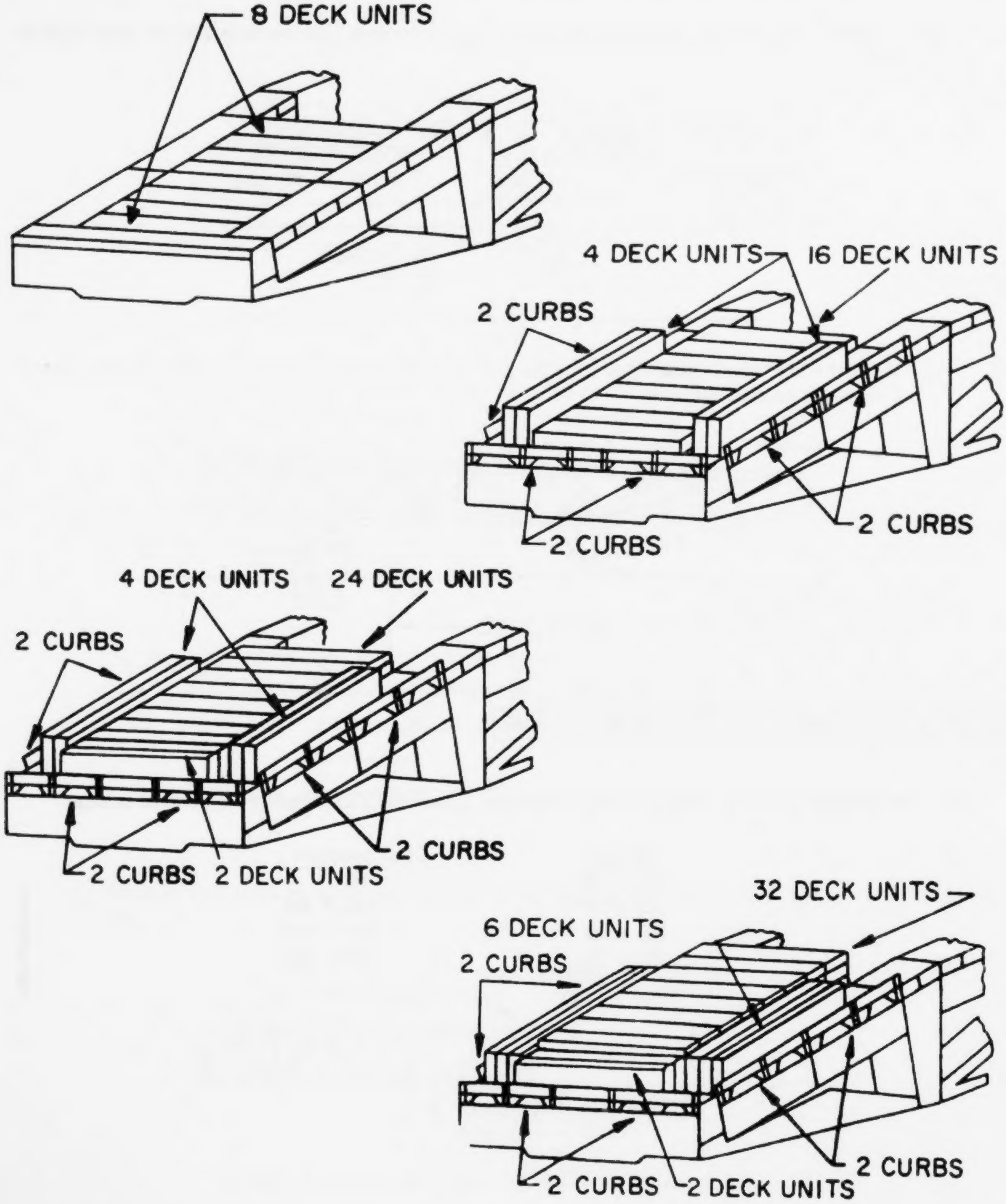
For 2E + 18 bay bridge, PROCEED TO STEP 2.a. 21.

20 For bridges requiring deck unit counterweight, assemble counterweight on end of bridge.

Bridge	Counterweight
2E + 19	8D
2E + 20	20D + 6C
2E + 21	30D + 6C
2E + 22	40D + 6C

2-12. DISASSEMBLY (Continued)

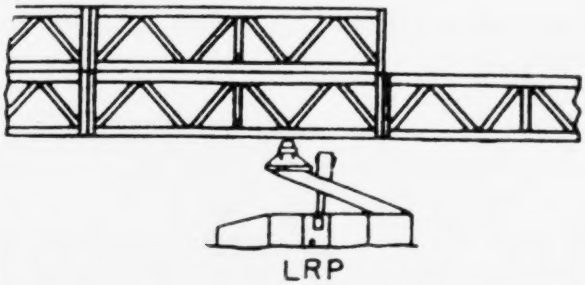
Step 2.a. Disassembly Procedures (Continued).


8 DECK UNITS
4 DECK UNITS
16 DECK UNITS
2 CURBS
2 CURBS
2 CURBS
4 DECK UNITS
24 DECK UNITS
2 CURBS
2 CURBS
2 CURBS
2 DECK UNITS
32 DECK UNITS
6 DECK UNITS
2 CURBS
2 CURBS
2 CURBS
2 DECK UNITS
2 CURBS

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

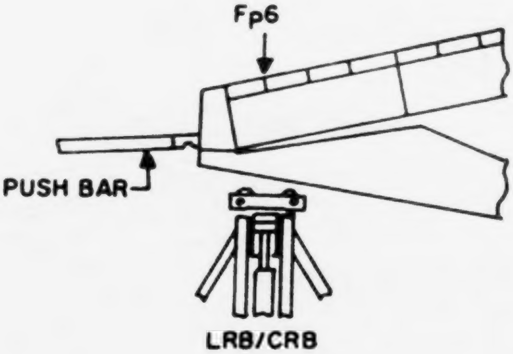
21. Using LRP, raise bridge off ground until jack is fully extended.



NOTE

Vehicle is holding bridge and roller catches in JRB are locked.

22. De-launch bridge until Fp6 is over the center of LRB/CRB. Stop de-launch and lock roller catches in JRB. DO NOT DISCONNECT VEHICLE FROM BRIDGE.



23. Operate jacks in LRB/CRB to raise rollers until weight of bridge is on LRB/CRB and off of JRB.

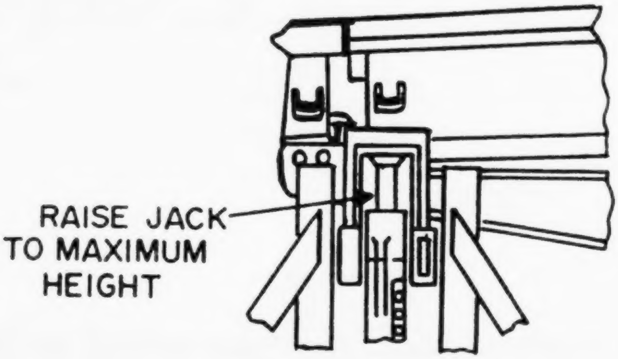
    (a) When raising LRB, if jacks have to be restaged, the jack seat must be placed on a capsill pin in holes 1 thru 3 of adjustable support. Do not position jack seat on pin in holes 4, 5, or 6.

2-12. DISASSEMBLY (Continued)

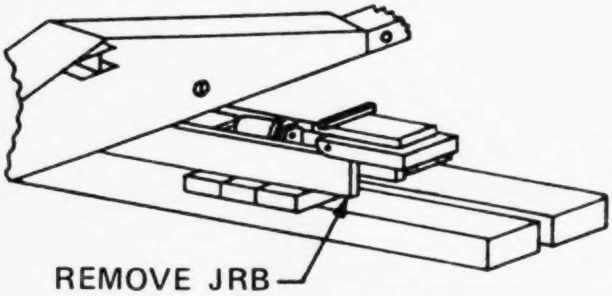
Step 2.a. Disassembly Procedures (Continued).

(b) When raising CRB, if jacks have to be restaged, the jack seat must be placed on a capsill pin. Capsill pin will be used in holes 1, 2, or 3 of adjustable support. Do not position jack seat on capsill pin holes 4, 5, or 6.

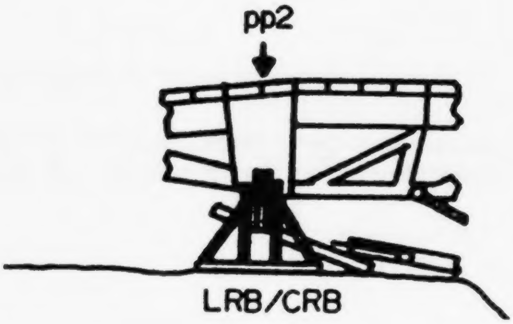
(c) Raise LRB/CRB to maximum height 4.1 ft (1.3 m) restaging jacks as needed. Level LRB/CRB at maximum height.



24. Remove JRB, packing and deck units from under ETP.



25. De-launch until Dp2 is over LRB/CRB.

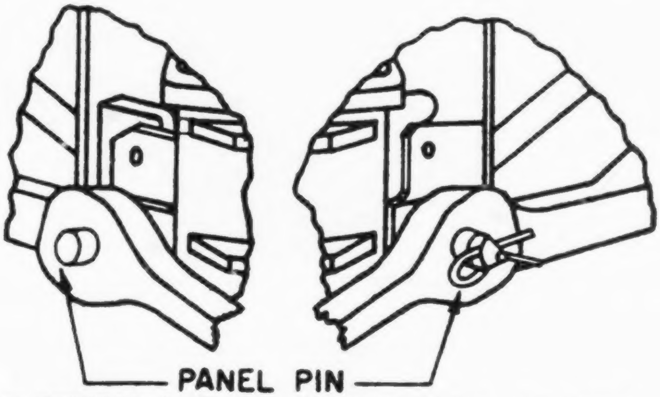


2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

26 Remove the fork end anchors of the long link from bottom panel pin at Dp0.

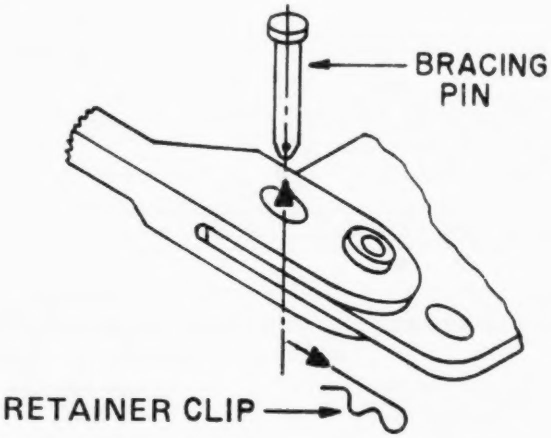
(a) Remove retainer clip from panel pin at Dp0.



BOTTOM AND JUNCTION PANEL AT DpO

(b) Remove retainer clips from bracing pins in fork end anchors.

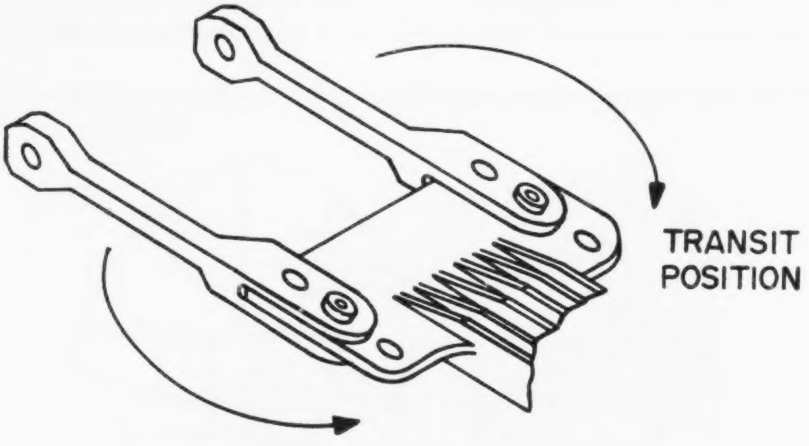
(c) Remove bracing pins from fork end anchors.



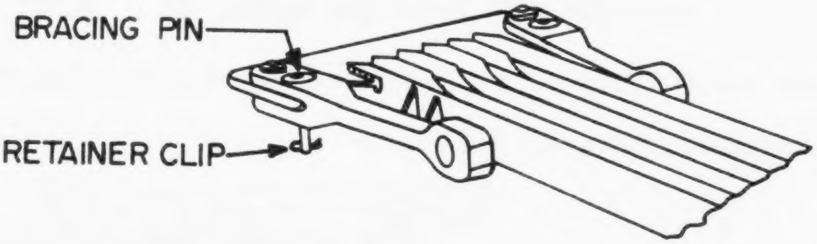
(d) Remove fork end anchors from panel pin at Dp0.

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).



(e) Swing fork end anchors into transit position.



(f) Pin fork end anchors in transit position with bracing pins. Secure with retainer clips. Let long link rest on skid placed on cross girder.

For 2E + 18 and 2 E + 21 bay bridges, PROCEED TO STEP 2.a. 28.

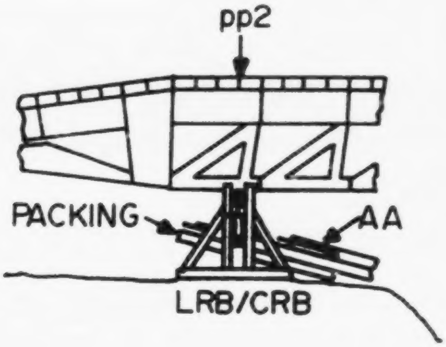
27 Attach launching nose heavy sections as required for bridge being disassembled.

Bridge Length	Nose Section
2E + 13 thru 2E + 15	3N1
2E + 16 and 2E + 17	4N1
2E + 19, 2E + 20 and 2E + 22	5N1

2-12. DISASSEMBLY (Continued)

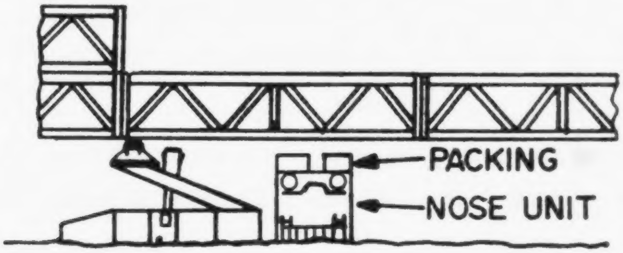
Step 2.a. Disassembly Procedures (Continued).

28 De-launch to panel point 2 of last bay of bridge.



29 Reposition the LRP under the launching nose. For two LRP method perform steps (h) thru (j). For method using nose section, perform (a) thru (g).

(a) Place one launching nose heavy section under nose. Nose section is placed perpendicular to the launching nose and against the base at the rear of the LRP.

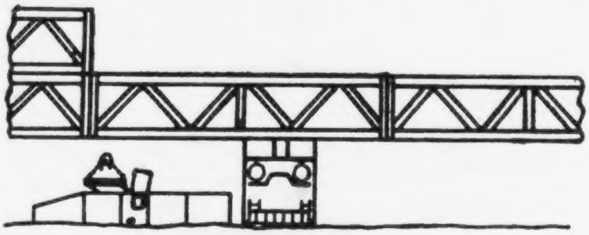


(b) Place two pieces of packing (3 in x 8 in x 36 in) on top of nose section to protect the edges of nose sections. If distance between bottom of launching nose and top of packing is greater than 1 ft (0.3 m), additional packing must be used.

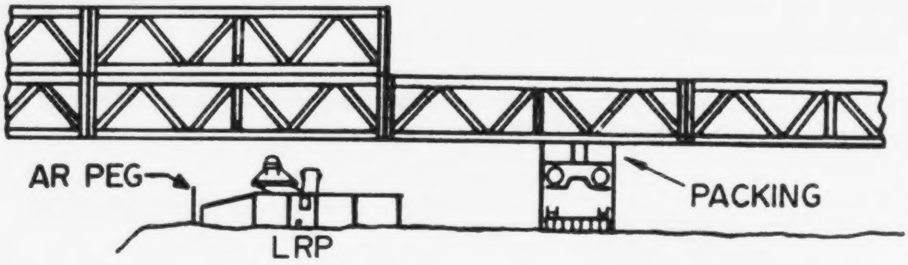
2-12. DISASSEMBLY (Continued).

Step 2.a. Disassembly Procedures (Continued)

(c) Operate hydraulic jack to lower the launching nose onto the packing and nose section.



(d) Move the LRP forward until its is against the original AR peg. Align the LRP with the launching nose.



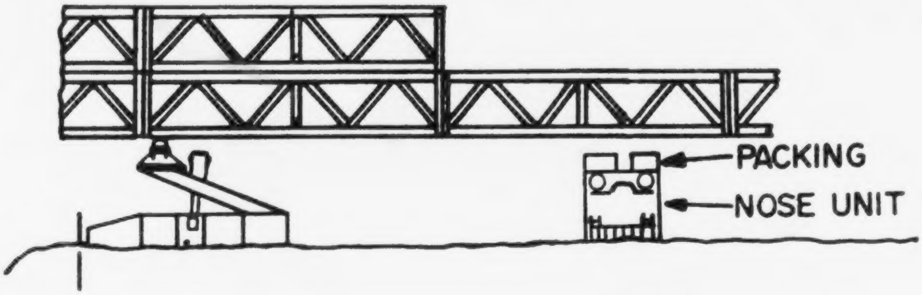
NOTE

If bank is soft, LRP may be placed on packing.

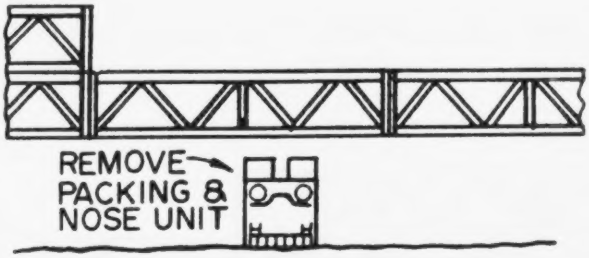
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

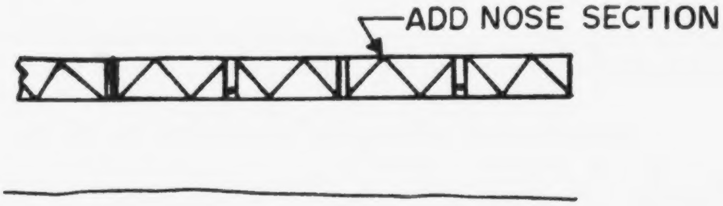
(e) Operate hydraulic jack to lift the launching nose off of the packing and nose section.


PACKING
NOSE UNIT

(f) Remove packing and nose section from under launching nose.


REMOVE PACKING & NOSE UNIT

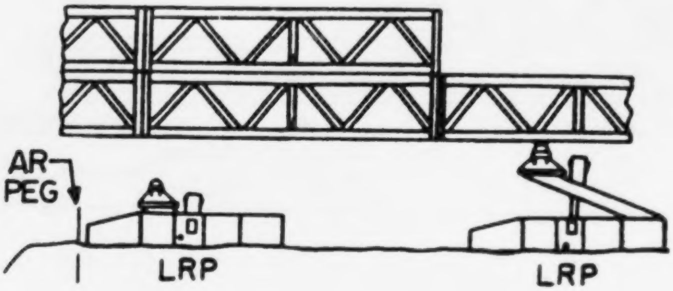
(g) Use the nose section in the launching nose to complete the heavy nose portion of the launching nose.


ADD NOSE SECTION

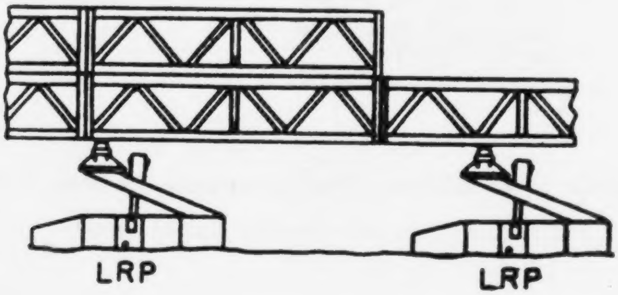
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

(h) Position second LRP under launching nose with base against original AR peg.



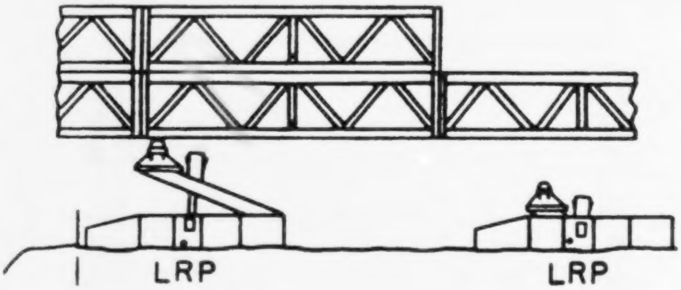
(i) Operate jack in LRP to raise launching nose off of first LRP.



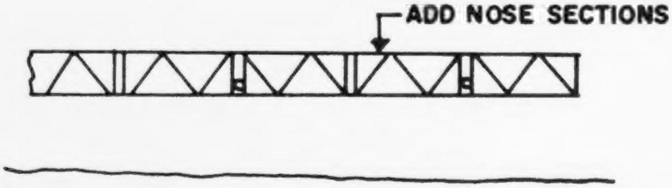
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

(j) Operate jack in first LRP to lower it. Remove LRP from under launching nose.



30 Add nose sections to launching nose if possible.



31 Remove the fork end anchors of the short link from bottom panel pin at panel point 0 of the last bay in bridge. Secure forks in transit position with bracing pins and retainer clips.

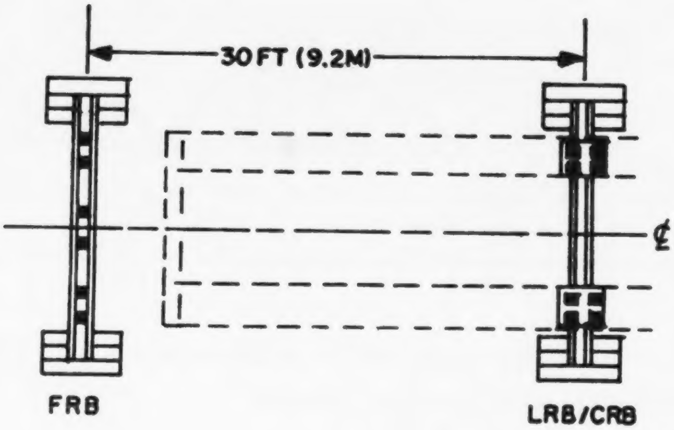
32 De-launch to panel point given below for bridge being disassembled.

Bridge	Panel Point	Bridge	Panel Point
2E + 13	12p2	2E + 18	17p2
2E + 14	13p2	2E + 19	18p2
2E + 15	14p2	2E + 20	19p2
2E + 16	15p2	2E + 21	20p2
2E + 17	16p2	2E + 22	21p2

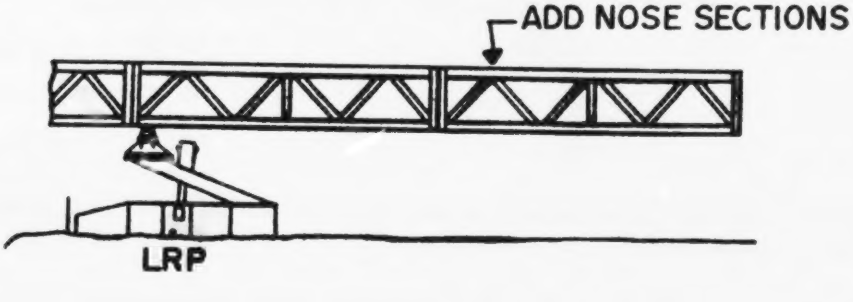
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

33 Assemble and position the front roller beam (FRB) over the center line at 30 ft (9.2 m) from the LRB/CRB.


30 FT (9.2M)
℄
FRB
LRB/CRB

34 Add nose sections to launching nose if possible.


ADD NOSE SECTIONS
LRP

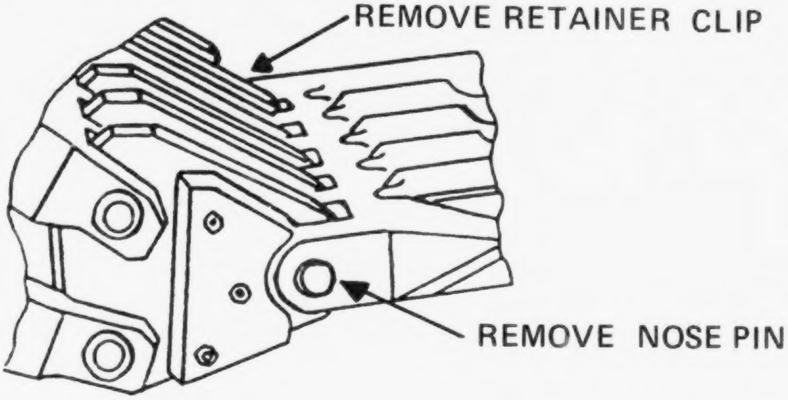
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

35 Remove anchor assembly.

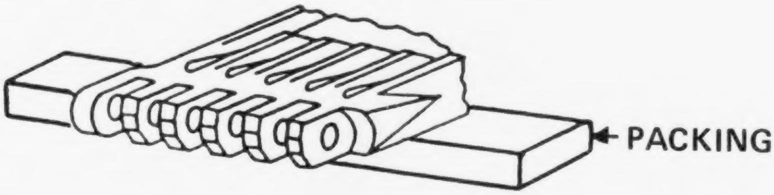
(a) Remove retainer clip from nose pin connecting anchor assembly to long link from post tensioning assembly.

(b) Remove nose pin from anchor assembly and long link.



(c) Move anchor assembly from under bridge.

(d) Place packing under end of long link.



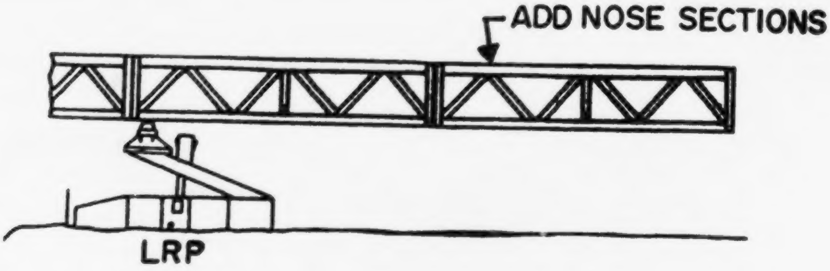
36 De-launch to panel point given below for bridge being disassembled.

Bridge	Panel Point	Bridge	Panel Point
2E + 13	10p4	2E + 18	15p4
2E + 14	11p4	2E + 19	16p4
2E + 15	12p4	2E + 20	17p4
2E + 16	13p4	2E + 21	18p4
2E + 17	14p4	2E + 22	19p4

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

37 Add nose sections to launching nose if possible.

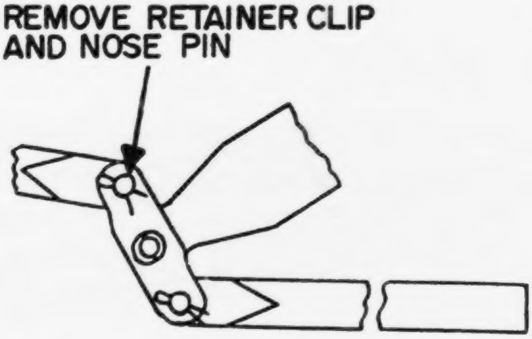

ADD NOSE SECTIONS
LRP

38 Remove link from post tensioning assembly link connecting block.

(a) Remove light tackle from link and bridge.

(b) Remove retainer clip from nose pin in link and link connecting block.

(c) Remove nose pin from link and link connecting block.


REMOVE RETAINER CLIP
AND NOSE PIN

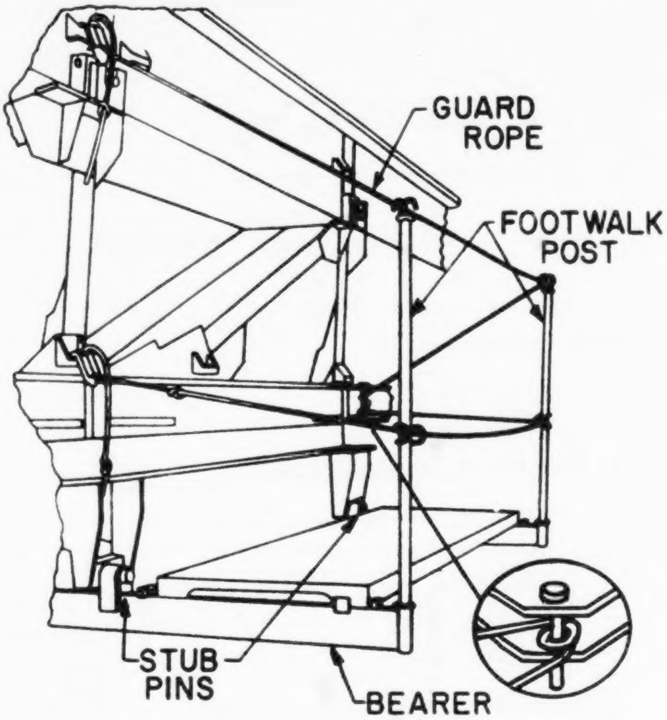
(d) Remove link from under bridge.

2-12. DISASSEMBLY (Continued)

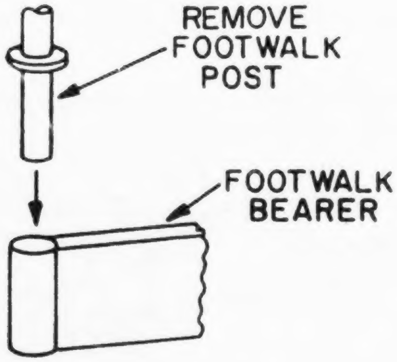
Step 2.a. Disassembly Procedures (Continued).

39 Remove post tensioning assembly.

(a) Remove guard rope from footwalk posts.


GUARD ROPE
FOOTWALK POST
STUB PINS
BEARER

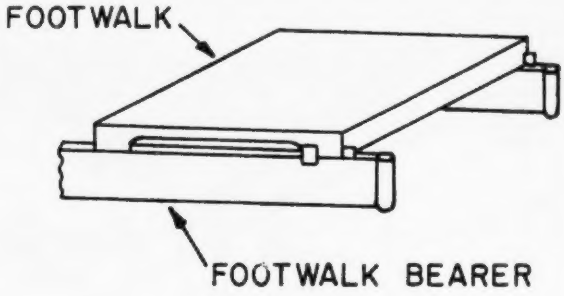
(b) Remove footwalk posts.


REMOVE FOOTWALK POST
FOOTWALK BEARER

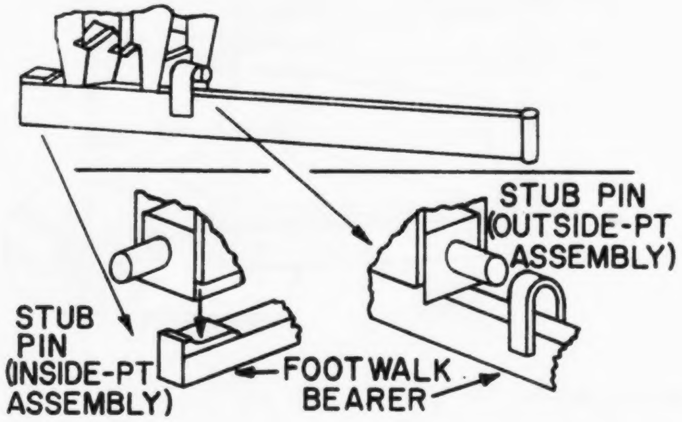
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

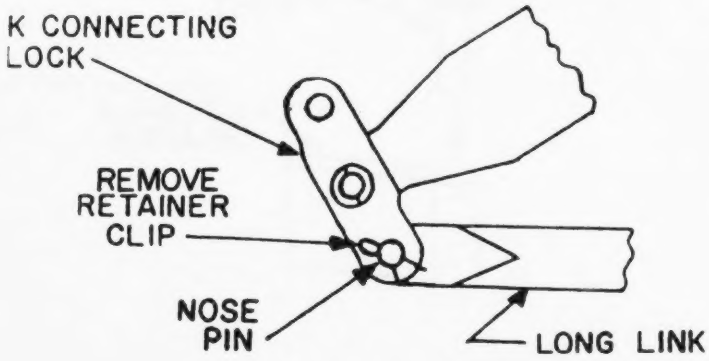
(c) Remove footwalk.


FOOTWALK
FOOTWALK BEARER

(d) Remove footwalk bearers.


STUB PIN (OUTSIDE-PT ASSEMBLY)
STUB PIN (INSIDE-PT ASSEMBLY)
FOOTWALK BEARER

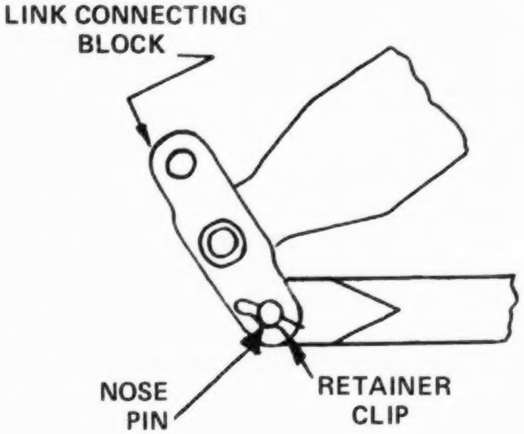
(e) Remove retainer clip from nose pin in link connecting block and link.


K CONNECTING LOCK
REMOVE RETAINER CLIP
NOSE PIN
LONG LINK

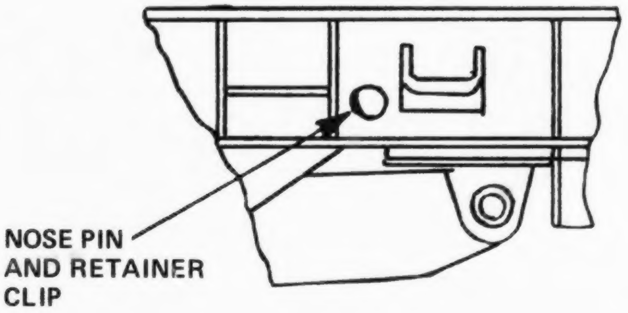
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

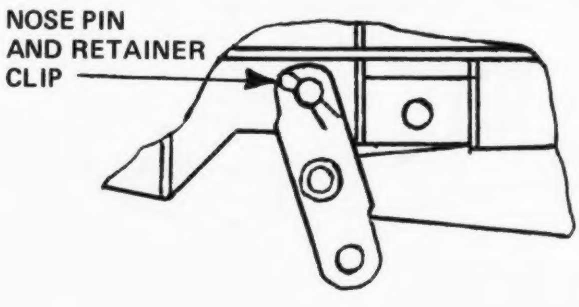
(f) Remove nose pin from link connecting block and link.


LINK CONNECTING BLOCK
NOSE PIN
RETAINER CLIP

(g) Lift and move post until the link connecting block can be pinned into the frame of the assembly.

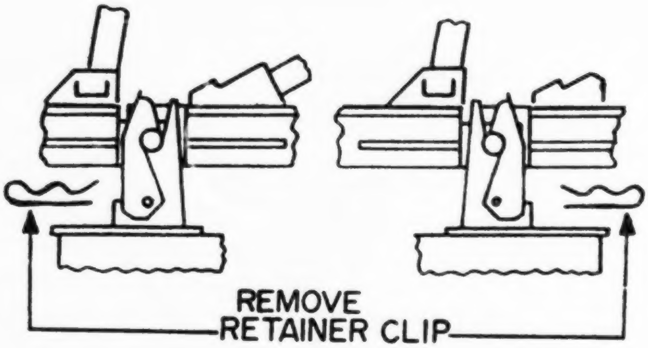

NOSE PIN AND RETAINER CLIP

(h) Pin link connecting block to frame with nose pin. Secure with retainer clip.

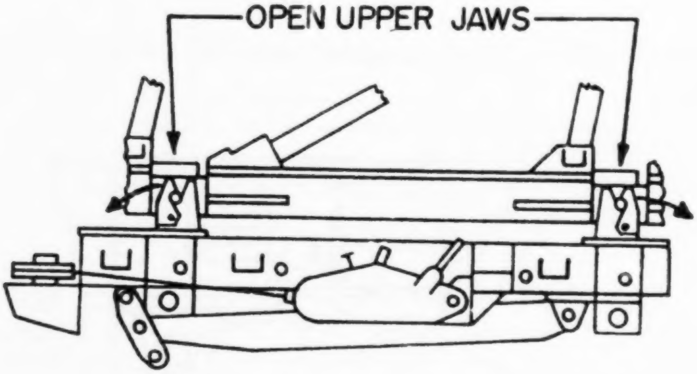

NOSE PIN AND RETAINER CLIP

2-12. DISASSEMBLY (Continued)

(i) Remove retainer clips from upper jaws of assembly.



(j) Lift assembly and open upper jaws of assembly. Lower assembly to the ground.



NOTE

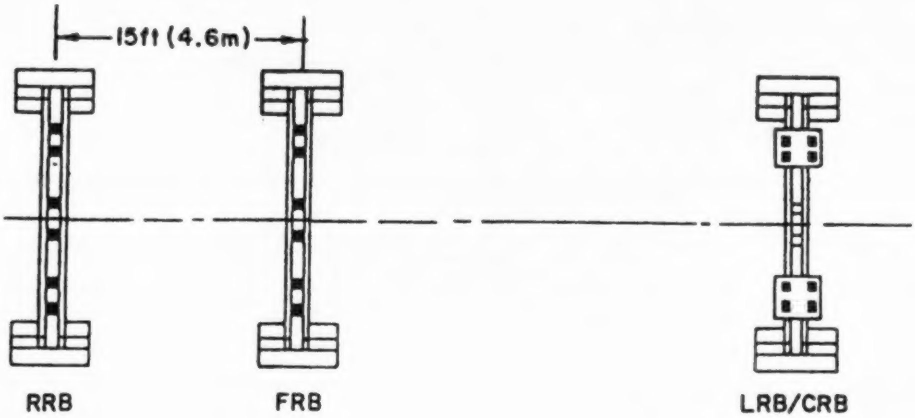
Opening of upper jaws may require positioning one person on each side of girder above tensioning assembly. This person will open upper jaws by pushing against them with the heel of his boot.

(k) Carry assembly from under bridge.

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

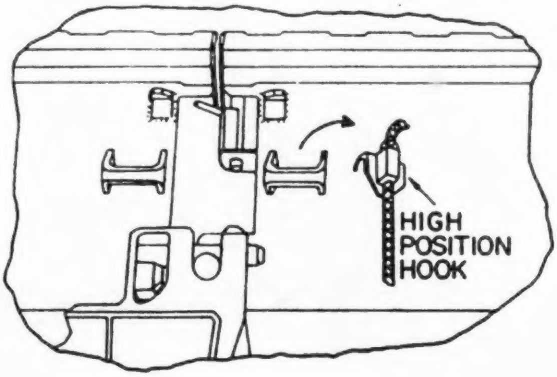
40 Assembly and position the rear roller beam (RRB) over the centerline at 15 ft (4.6 m) from the FRB.



41 Removal of light tackle. Remove light tackle from links under panel points listed below.

Bridge Length	Panel Point	Bridge Length	Panel Point
2E + 13	10p1	2E + 18	15p1
2E + 14	11p1	2E + 19	16p1
2E + 15	12p1	2E + 20	17p1
2E + 16	13p1	2E + 21	18p1
2E + 17	14p1	2E + 22	19p1

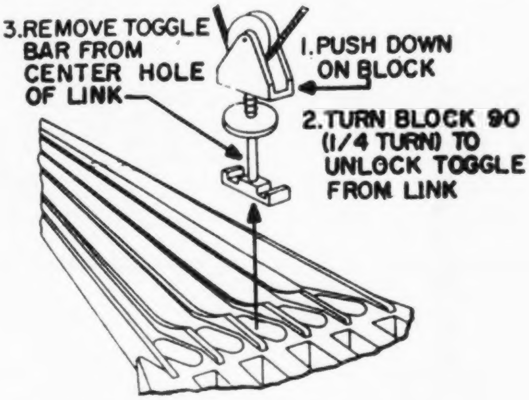
(a) Remove hook from carrying bar bracket of top panel.



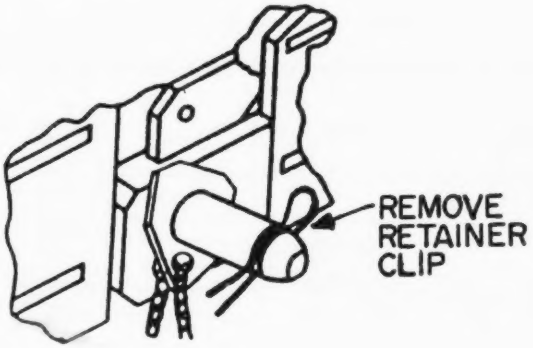
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

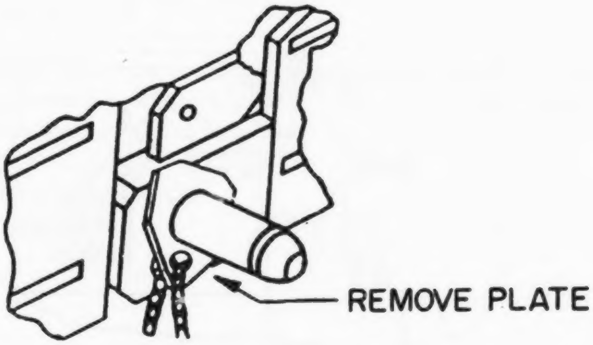
(b) Push toggle bar down and turn 90° (1/4 turn) to unlock bar from link.


3.REMOVE TOGGLE BAR FROM CENTER HOLE OF LINK
1.PUSH DOWN ON BLOCK
2.TURN BLOCK 90 (1/4 TURN) TO UNLOCK TOGGLE FROM LINK

(c) Remove toggle bar from link.


REMOVE RETAINER CLIP

(d) Remove retainer clip from bottom panel pin.


REMOVE PLATE

(e) Remove plate from bottom panel pin.

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

42. De-launch to panel point given below for bridge being disassembled.

Bridge	Panel Point	Bridge	Panel Point
2E + 13	8p4	2E + 18	13p4
2E + 14	9p4	2E + 19	14p4
2E + 15	10p4	2E + 20	17p4
2E + 16	11p4	2E + 21	16p4
2E + 17	12p4	2E + 22	17p4

43. Add nose sections as indicated below for bridge being disassembled.

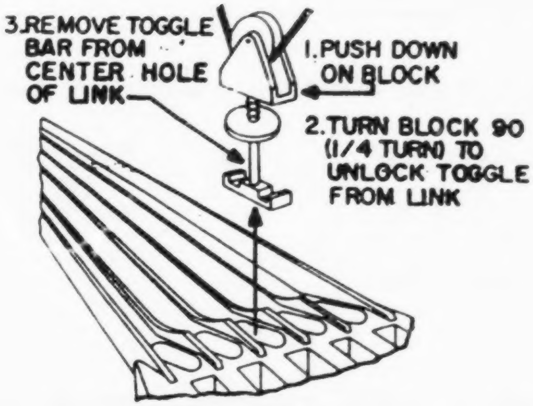
Bridge	Nose Section	Bridge	Nose Section
2E + 13	LLN-R	2E + 18	1N1
2E + 14	LLN-R&F	2E + 19	1N1
2E + 15	LLN-F	2E + 20	1N1
2E + 16	1N1 & LLN-R	2E + 21	2N1 & 1N1
2E + 17	1N1 & LLN-R	2E + 22	2N1 & 1N1

44. Remove light tackle.

   (a) Remove hook from top panel.

   (b) Remove plate from panel pin in bottom panel.

   (c) Remove toggle bar from link.


3.REMOVE TOGGLE BAR FROM CENTER HOLE OF LINK
1.PUSH DOWN ON BLOCK
2.TURN BLOCK 90 (1/4 TURN) TO UNLOCK TOGGLE FROM LINK

For 2E + 18 thru 2E + 20 bay bridges, PROCEED TO STEP 2.a. 51 .

For 2E + 21 thru 2E + 22 bay bridges, PROCEED TO STEP 2.a. 46 .

2-12. DISASSEMBLY (Continued)

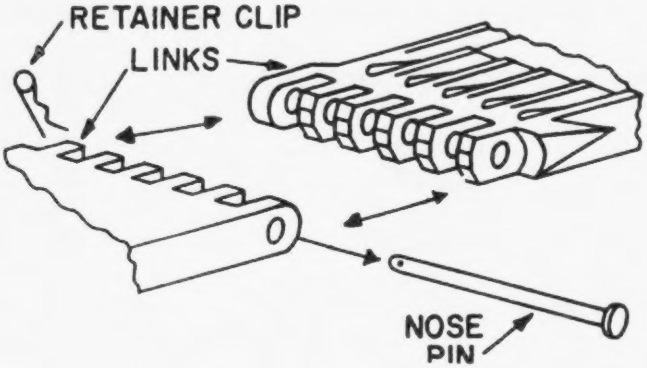
Step 2.a. Disassembly Procedures (Continued).

45 Remove link from link chain.

(a) Remove retainer clip from nose pin in links.

(b) Remove nose pin from links.

(c) Remove link from link chain.



For 2E + 13 thru 2E + 16 bay bridges, PROCEED TO STEP 2.a. 51.

For 2E + 17 bay bridge, PROCEED TO STEP 2.a. 48.

46 Continue de-launch to panel point given below for bridge being disassembled.

Bridge Length	Panel Point
2E + 21	14p4
2E + 22	15p0

47 Remove counterweight from bridge.

NOTE

The method used to remove counterweight depends on equipment available. The standard method of removing counterweight is to have the men on the bridge hand it to other men on the headboards of dump trucks positioned on each side of the launch vehicle. If available, bucket loaders, fork lifts, or cranes can be used.

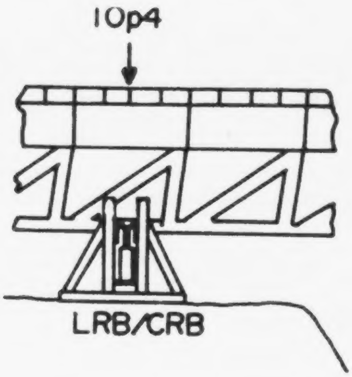
2-12. DISASSEMBLY (Continued)

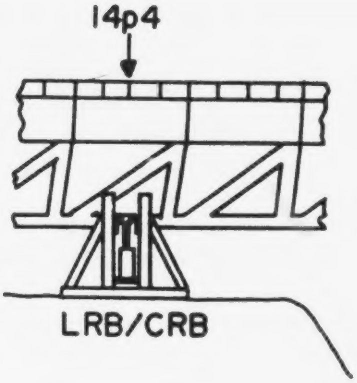
Step 2.a. Disassembly Procedures (Continued).

For 2E + 22 bay bridge, PROCEED TO STEP 2.a. 49.

48 Continue de-launch to panel point given below for bridge being disassembled.

Bridge Length	Panel Point
2E + 17	10p4
2E + 21	14p4



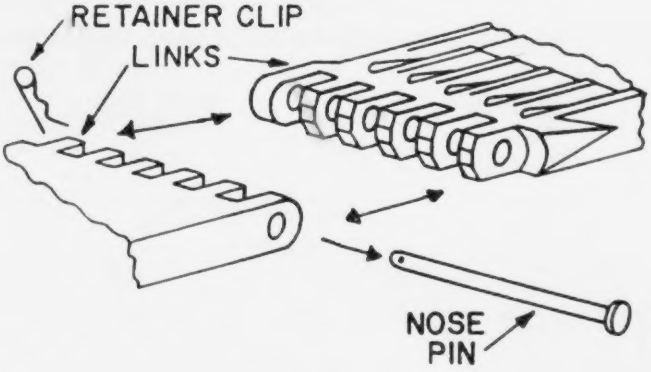


49 Remove light tackle.

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

50 Remove link from link chain.


RETAINER CLIP
LINKS
NOSE PIN

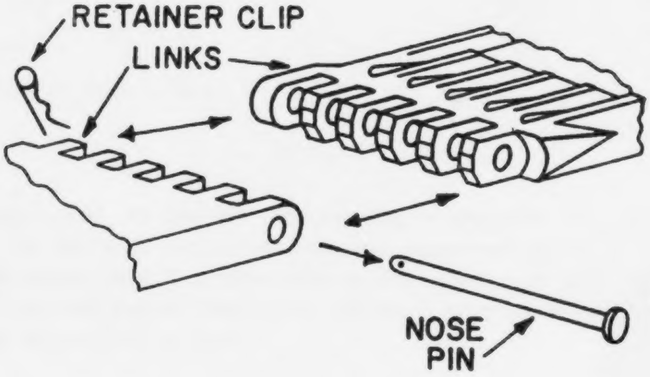
51 Continue de-launch to panel point given below for bridge being disassembled.

Bridge Length	Panel Point
2E + 13 and 2E + 14	7p4
2E + 15	8p4
2E + 16 and 2E + 17	9p4
2E + 18	11p4
2E + 19 and 2E + 21	12p4
2E + 20 and 2E + 22	13p4

52 Remove light tackle for all lengths of bridges. For 2E + 13 thru 2E + 17 only, remove anti-flutter tackle.

For 2E + 21 bay bridge, PROCEED TO STEP 2.a. 54.

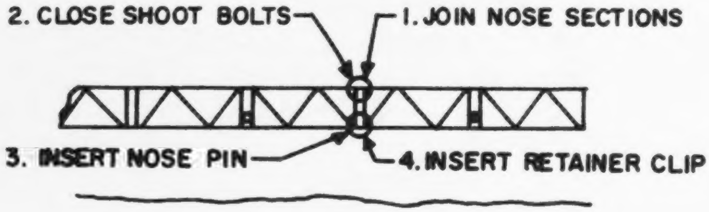
53 Remove reinforcing link.


RETAINER CLIP
LINKS
NOSE PIN

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

54 Add nose sections as required.


2. CLOSE SHOOT BOLTS
1. JOIN NOSE SECTIONS
3. INSERT NOSE PIN
4. INSERT RETAINER CLIP

For 2E + 13 and 2E + 15 bay bridges, PROCEED TO STEP 2.a. 59.

For 2E + 14, 2E + 16 and 2E + 17 bay bridges,

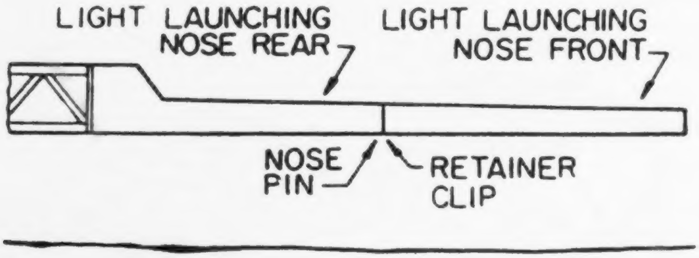
PROCEED TO STEP 2.a. 63.

55 De-launch to panel point given below for bridge being disassembled.

Bridge Length	Panel Point
2E + 18	9p4
2E + 19	10p4
2E + 20 thru 2E + 22	11p4

For 2E + 22 bay bridge, PROCEED TO STEP 2.a. 57.

56 Add light launching nose front section.

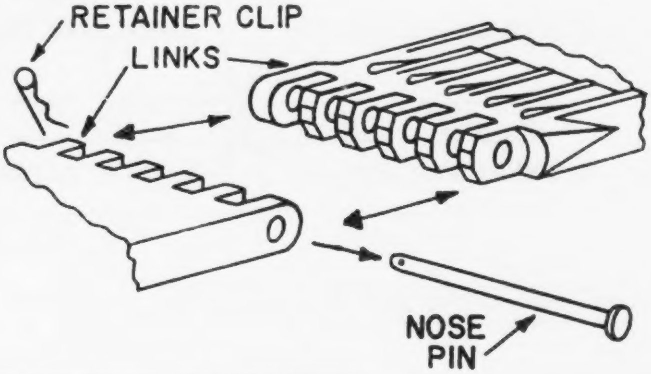

LIGHT LAUNCHING NOSE REAR
LIGHT LAUNCHING NOSE FRONT
NOSE PIN
RETAINER CLIP

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

57 Remove light tackle and anti-flutter tackle.

58 Remove link from link chain.


RETAINER CLIP
LINKS
NOSE PIN

For 2E + 18 and 2E + 20 thru 2E + 22 bay bridges,

PROCEED TO STEP 2.a. 63.

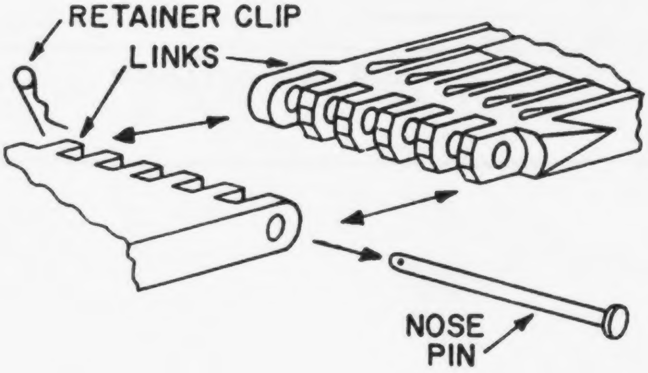
59 Continue de-launch to panel point given below for bridge being disassembled.

Bridge Length	Panel Point
2E + 13	6p2
2E + 15	7p4
2E + 19	9p4

60 Remove light tackle.

For 2E + 15 bay bridge, PROCEED TO STEP 2.a. 63.

61 Remove link from link chain.

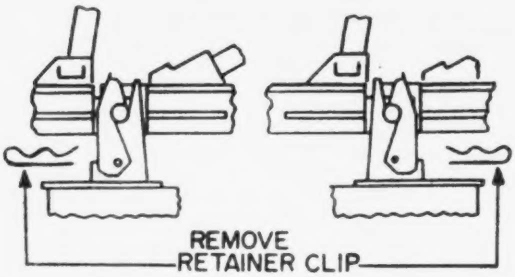

RETAINER CLIP
LINKS
NOSE PIN

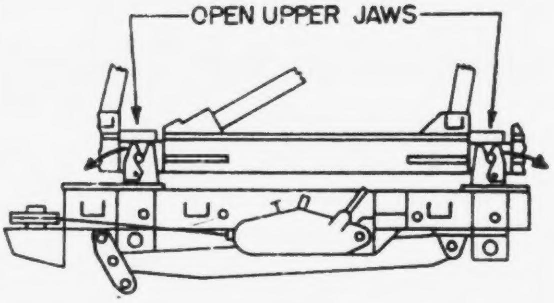
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

For 2E + 19 bay bridge, PROCEED TO STEP 2.a. 63.

62 Remove post tensioning assembly.

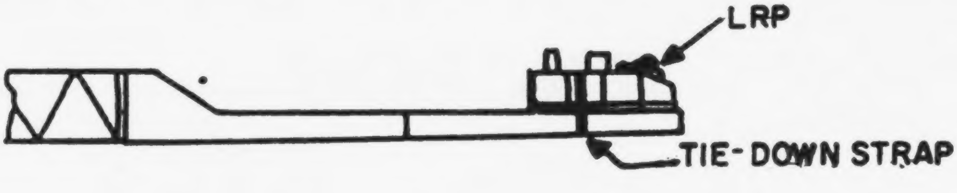

REMOVE
RETAINER CLIP


OPEN UPPER JAWS

63 De-launch to panel point given below for bridge being disassembled.

Bridge	Panel Point	Bridge	Panel Point
2E + 13	6p0	2E + 18	8p0
2E + 14	6p4	2E + 19	8p5
2E + 15	7p0	2E + 20	9p6
2E + 16	7p2	2E + 21	9p4
2E + 17	7p6	2E + 22	10p0

64 Recover LRP.


LRP
TIE-DOWN STRAP

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

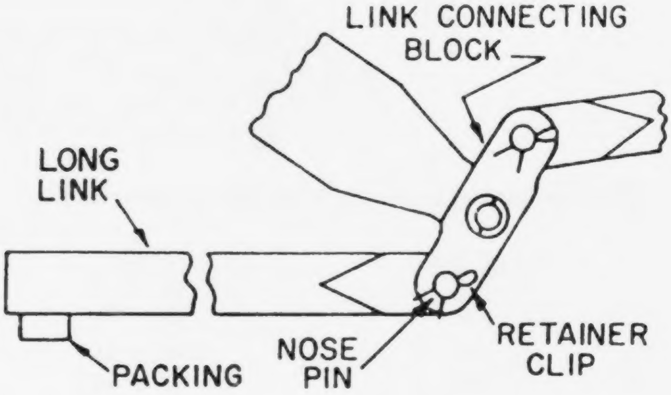
For 2E + 13 bay bridge, PROCEED TO STEP 2.a. 87.

For 2E + 15 bay bridge, PROCEED TO STEP 2.a. 74.

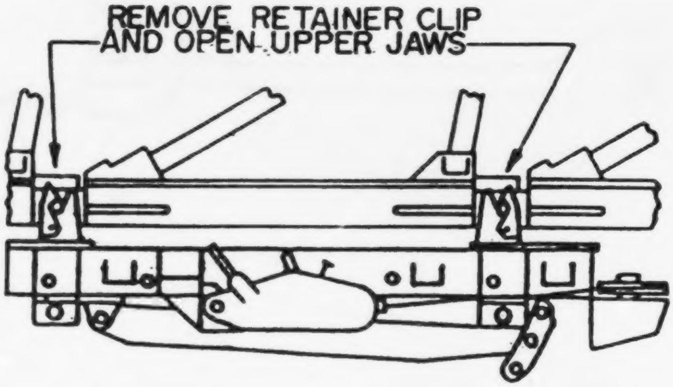
For 2E + 16, 2E + 17 and 2E + 20 thru 2E + 22 bay bridges, PROCEED TO STEP 2.a. 67 .

For 2E + 18 and 2E + 19 bay bridges, PROCEED TO STEP 2.a. 69 .

65. Remove link from post tensioning assembly.


LINK CONNECTING BLOCK
LONG LINK
PACKING
NOSE PIN
RETAINER CLIP

66. Remove post tensioning assembly.


REMOVE RETAINER CLIP AND OPEN UPPER JAWS

For 2E + 14 bay bridge, PROCEED TO STEP 2.a. 79 .

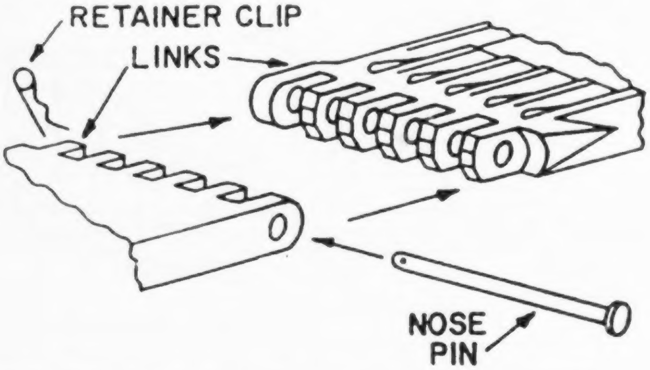
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

67. Remove light tackle from link.

For 2E + 20 and 2E + 21 bay bridges, PROCEED TO STEP 2.a. 69.

68. Remove link from link chain.



For 2E + 16 and 2E + 17 bay bridges, PROCEED TO STEP 2.a. 74.

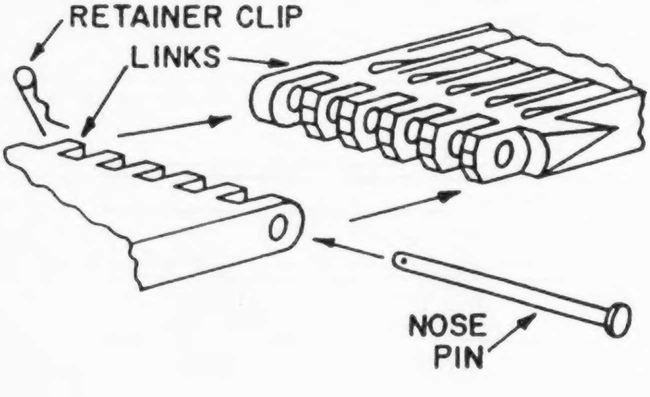
69. Boom to panel point given below for bridge being disassembled. Lock rollers and disconnect vehicle for 2E + 21 and 2E + 22 bay bridges only.

Bridge Length	Panel Point
2E + 18 thru 2E + 21	15p0
2E + 22	15p4

70. Remove light tackle from link.

For 2E + 18 and 2E + 20 bay bridges, PROCEED TO STEP 2.a. 74.

71. Remove link from link chain.

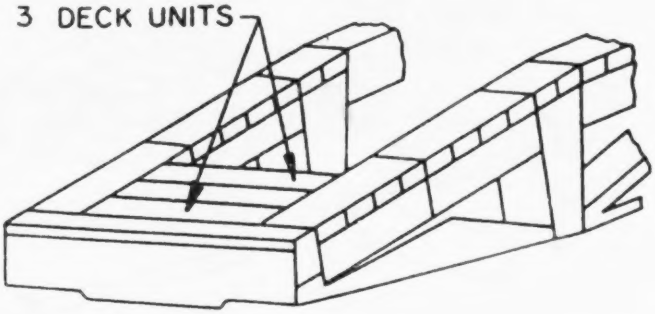


2-12. DISASSEMBLY (Continued)

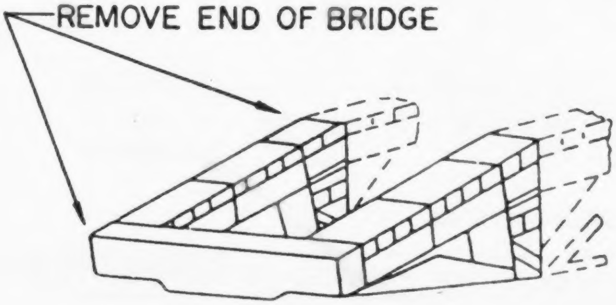
Step 2.a. Disassembly Procedures (Continued).

For 2E + 19 bay bridge, PROCEED TO STEP 2.a. 74 .

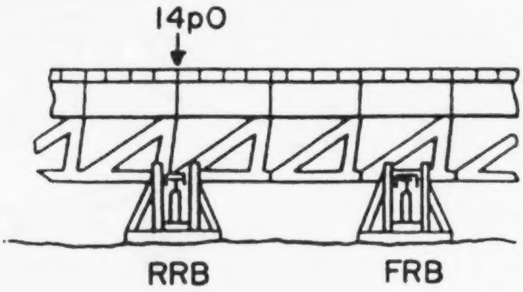
72. Remove 3D counterweight.


3 DECK UNITS

73. Remove the end of bridge.


REMOVE END OF BRIDGE

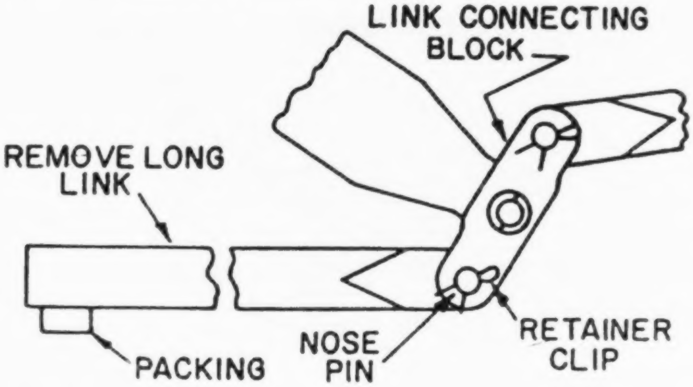
74. Boom bridge to panel point 14p0 over RRB. Lock rollers and disconnect vehicle for 2E + 19 and 2E + 20 bay bridges only.


14p0
RRB
FRB

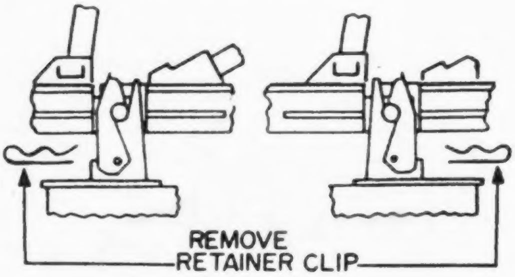
2-12. DISASSEMBLY (Continued)

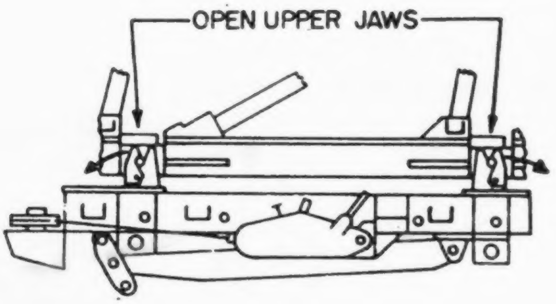
Step 2.a. Disassembly Procedures (Continued).

75 Remove link from post tensioning assembly.


LINK CONNECTING BLOCK
REMOVE LONG LINK
PACKING
NOSE PIN
RETAINER CLIP

76 Remove post tensioning assembly.


REMOVE RETAINER CLIP


OPEN UPPER JAWS

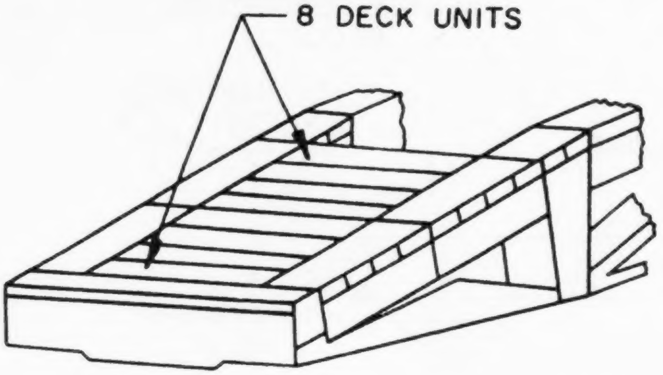
For 2E + 15 thru 2E + 18 and 2E + 21 and 2E + 22 bay bridges,

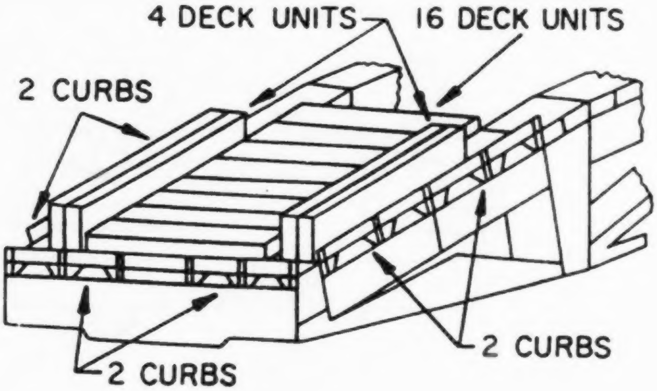
PROCEED TO STEP 2.a. 79.

2-12. DISASSEMBLY (Continued)

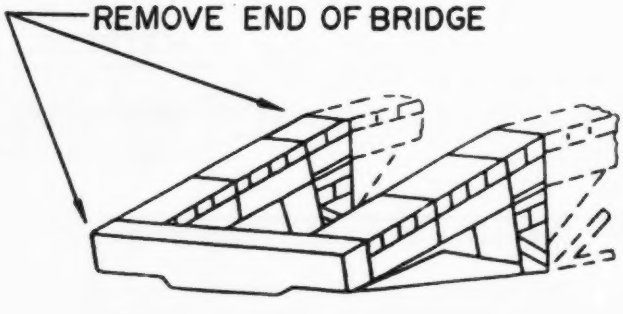
Step 2.a. Disassembly Procedures (Continued).

77 Remove counterweight from 2E + 19 and 2E + 20 bay bridges.


8 DECK UNITS


4 DECK UNITS
16 DECK UNITS
2 CURBS
2 CURBS
2 CURBS

78 Remove the end of bridge.


REMOVE END OF BRIDGE

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

79. Boom to panel point given below for bridge being disassembled. Lock rollers and disconnect vehicle for 2E + 18 thru 2E + 22 bay bridges only.

Bridge	Panel Point	Bridge	Panel Point
2E + 14	13p6	2E + 17	12p0
2E + 15	13p0	2E + 18 thru 2E + 22	13p0
2E + 16	12p6		

80. Remove light tackle from link connected to anchor assembly.

For 2E + 14 thru 2E + 17 bay bridges, PROCEED TO STEP 2.a. 87.

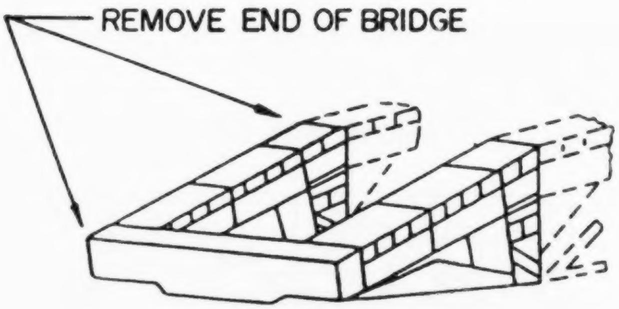
For 2E + 19 bay bridge, PROCEED TO STEP 2.a. 85.

For 2E + 20 bay bridge, PROCEED TO STEP 2.a. 84.

For 2E + 21 bay bridge, PROCEED TO STEP 2.a. 83.

For 2E + 22 bay bridge, PROCEED TO STEP 2.a. 82.

81. Remove the end of bridge.

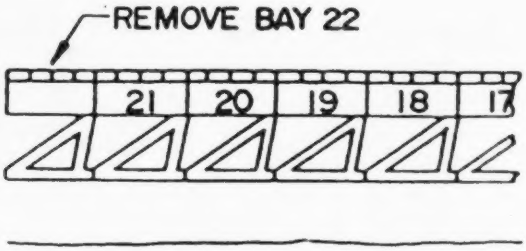


For 2E + 18 bay bridge, PROCEED TO STEP 2.a. 86.

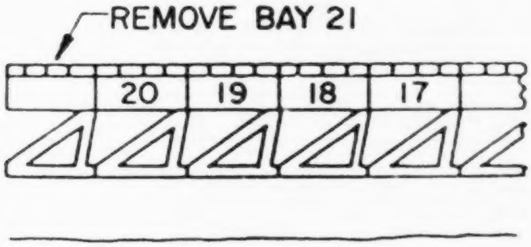
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

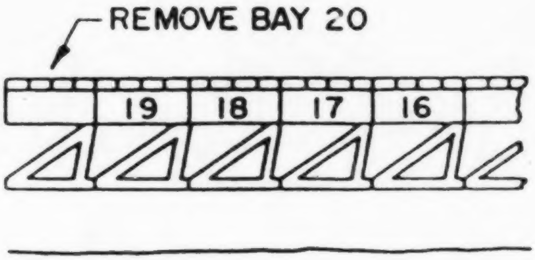
82. Remove bay 22. Remove deck unit from bay 21.


REMOVE BAY 22
21
20
19
18
17

83. Remove bay 21. Remove deck unit from bay 20.


REMOVE BAY 21
20
19
18
17

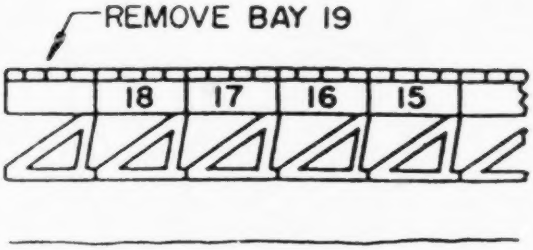
84. Remove bay 20. Remove deck unit from bay 19.


REMOVE BAY 20
19
18
17
16

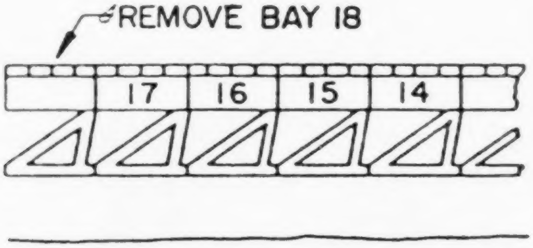
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

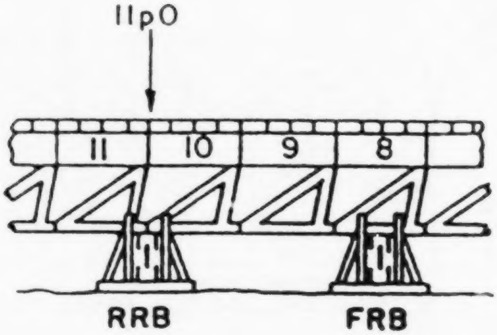
85. Remove bay 19. Remove deck unit from bay 18.


REMOVE BAY 19
18
17
16
15

86. Remove bay 18. Remove deck unit from bay 17 for 2E + 18 and 2E + 20 thru 2E + 22 bay bridges.


REMOVE BAY 18
17
16
15
14

87. Boom to panel point 11p0 over RRB. DO NOT DISCONNECT VEHICLE. Do not lock rollers.

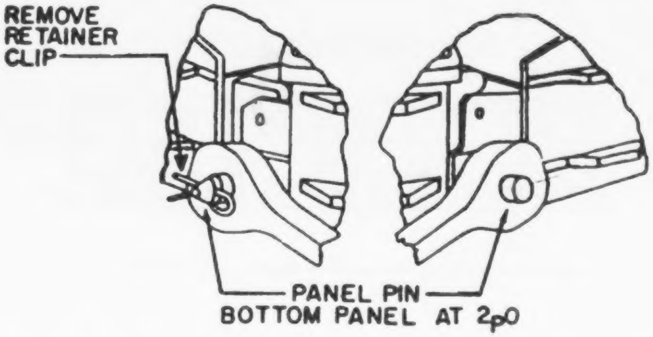

11p0
11
10
9
8
RRB
FRB

88. Remove long reinforcing link.

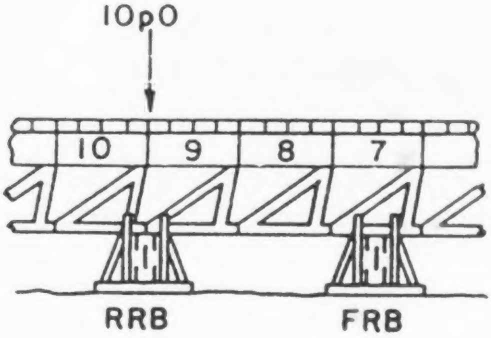
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

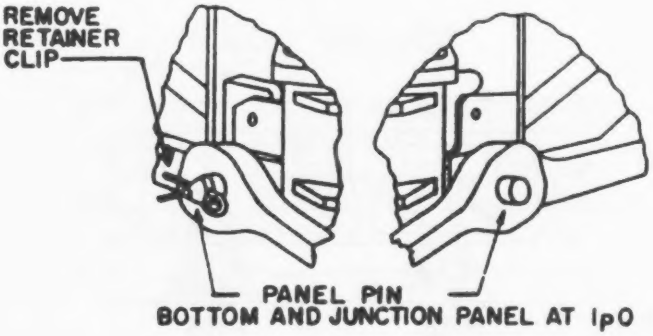
89. Remove the fork end anchors of the short link from bottom panel pin at panel point 2p0.


REMOVE RETAINER CLIP
PANEL PIN
BOTTOM PANEL AT 2p0

90. Boom to panel point 10p0 over RRB. Lock rollers and disconnect vehicle.


10p0
10
9
8
7
RRB
FRB

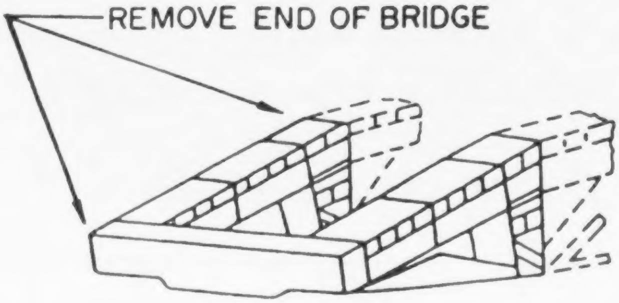
91. Remove the fork end anchors of the long link from bottom panel pin at panel point 1p0.


REMOVE RETAINER CLIP
PANEL PIN
BOTTOM AND JUNCTION PANEL AT 1p0

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

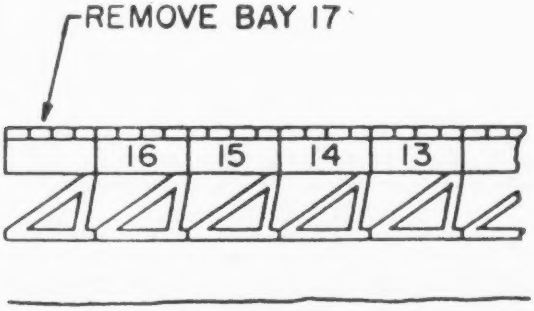
92. Remove the end of bridge.


REMOVE END OF BRIDGE

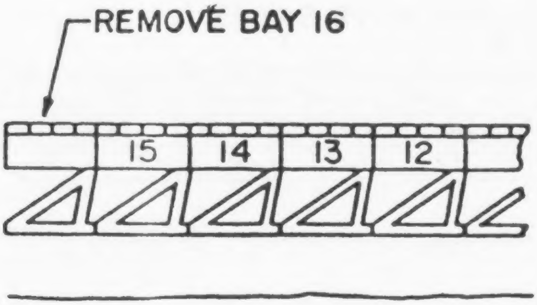
93. PROCEED TO APPROPRIATE STEP.

FOR BRIDGE	STEP 2.a.
2E + 13	(98)
2E + 14	(97)
2E + 15	(96)
2E + 16	(95)
2E + 17	(94)

94. Remove bay 17. Remove deck unit from bay 16.


REMOVE BAY 17
16
15
14
13

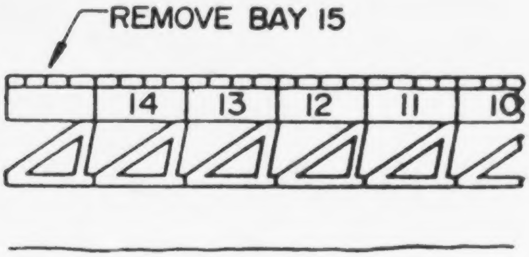
95. Remove bay 16. Remove deck unit from bay 15.


REMOVE BAY 16
15
14
13
12

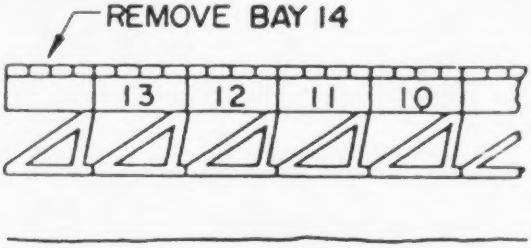
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

96. Remove bay 15. Remove deck unit from bay 14.

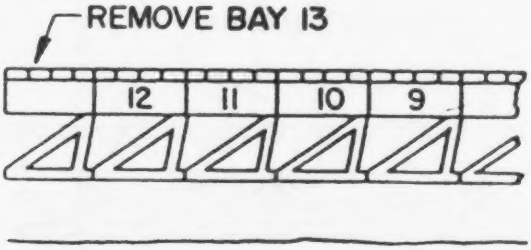

REMOVE BAY 15
14
13
12
11
10

97. Remove bay 14. Remove deck unit from bay 13.


REMOVE BAY 14
13
12
11
10

For 2E + 18 thru 2E + 22 bay bridges, PROCEED TO STEP 2.a. 99.

98. Remove bay 13. Remove deck unit from bay 12.


REMOVE BAY 13
12
11
10
9

2-12. DISASSEMBLY (Continued)

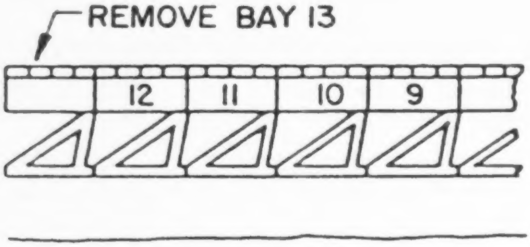
Step 2.a. Disassembly Procedures (Continued).

99. Boom bridge to panel point given below for bridge being disassembled. Lock rollers and disconnect vehicle. Disassemble and remove LRB/CRB from site.

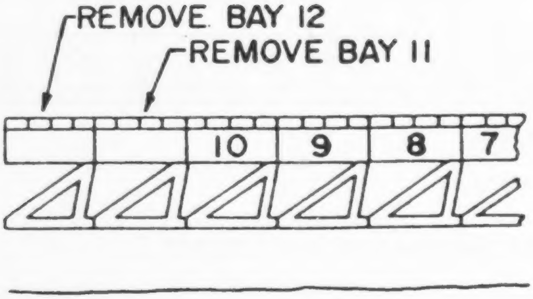
Bridge Length	Panel Point
2E + 13 thru 2E + 15	4p7
2E + 16 thru 2E + 22	4p5

For 2E + 13 thru 2E + 17 bay bridges, PROCEED TO STEP 2.a. 101.

100. Remove bay 13. Remove deck unit from bay 12 for 2E + 18 thru 2E + 22 bay bridges.



101. Remove bays 12 and 11.

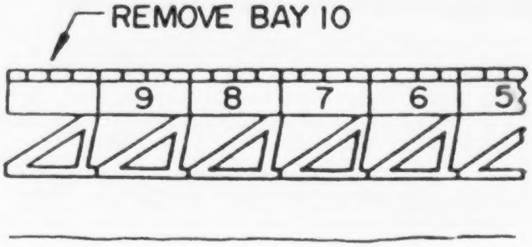


For 2E + 18 thru 2E + 22 bay bridges, PROCEED TO STEP 2.a. 103.

102. Remove bay 10.

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

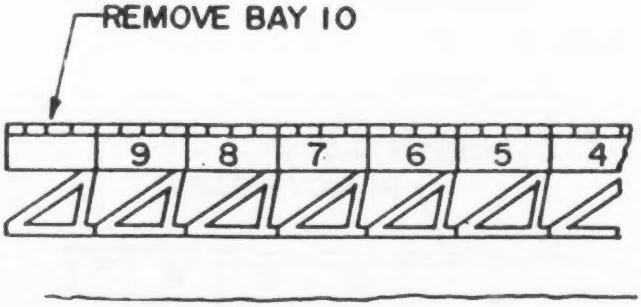

REMOVE BAY 10
9
8
7
6
5

103. Boom bridge to panel point given below for bridge being disassembled. Lock rollers and disconnect vehicle.

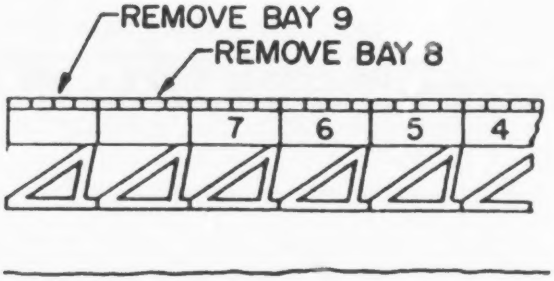
Bridge Length	Panel Point
2E + 13 thru 2E + 15	3p0
2E + 16 thru 2E + 22	2p7

For 2E + 13 thru 2E + 17 bay bridges, PROCEED TO STEP 2.a. 105.

104. Remove bay 10.


REMOVE BAY 10
9
8
7
6
5
4

105. Remove bays 9 and 8. Remove deck unit from bay 7.

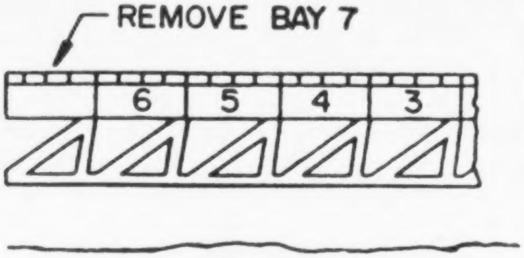

REMOVE BAY 9
REMOVE BAY 8
7
6
5
4

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

For 2E + 18 thru 2E + 22 bay bridges, PROCEED TO STEP 2.a. 107.

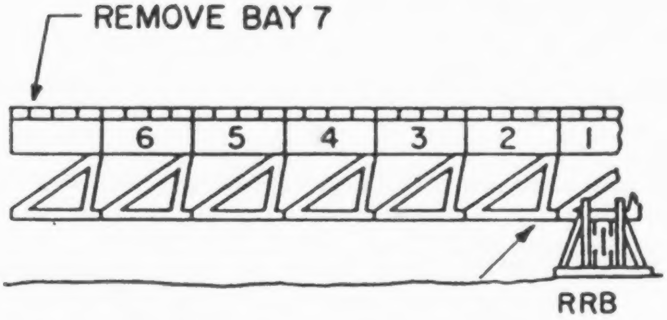
106. Remove bay 7.


REMOVE BAY 7
6
5
4
3

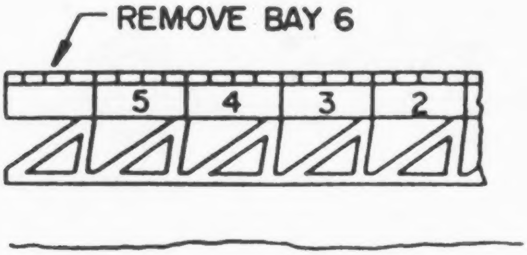
107. Boom to panel point 1p4 over RRB, then PROCEED TO STEPS GIVEN BELOW. Lock rollers and disconnect vehicle.

BRIDGE	STEP 2.a.
2E + 13 thru 2E + 17	(109)
2E + 18 thru 2E + 22	(108)

108. Remove bay 7.


REMOVE BAY 7
6
5
4
3
2
1
RRB

109. Remove bay 6. Remove deck unit from bay 1 for all bridges.


REMOVE BAY 6
5
4
3
2

2-12. DISASSEMBLY (Continued)

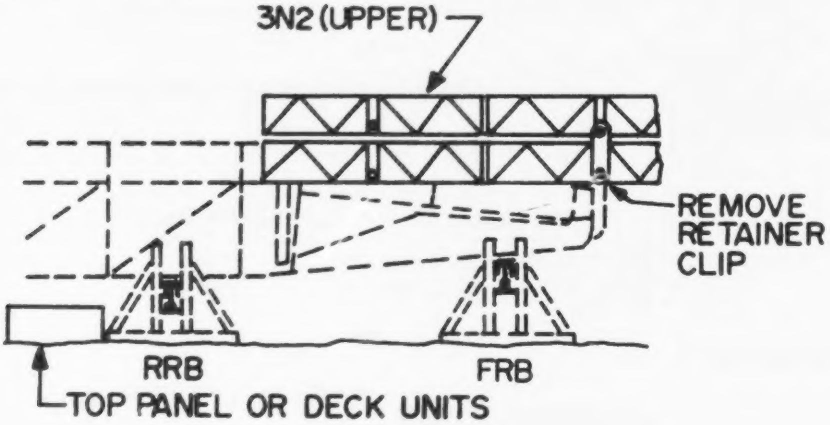
Step 2.a. Disassembly Procedures (Continued).

PROCEED TO APPROPRIATE STEP

BRIDGE	STEP 2.a.
2E + 13 thru 2E + 15	(112)
2E + 16 thru 2E + 17	(111)

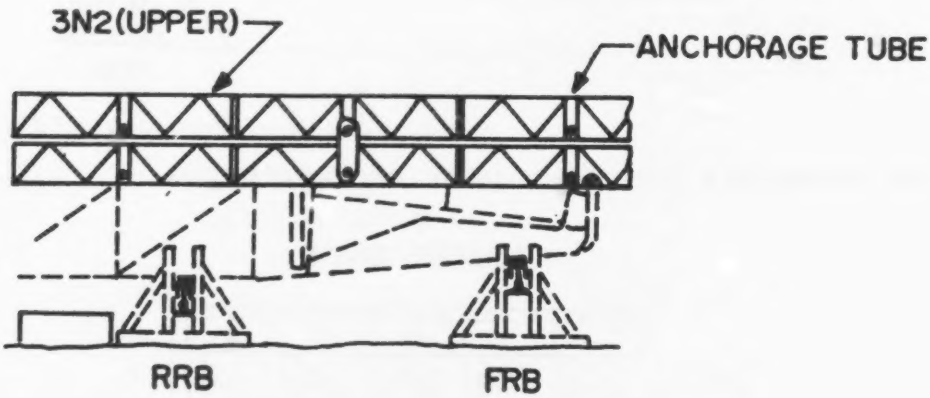
110 Remove double story nose (3N2).

(a) Remove retainer clip from panel pin in nose roller and anchorage tube.


3N2 (UPPER)
REMOVE RETAINER CLIP
RRB
FRB
TOP PANEL OR DECK UNITS

(b) With center crew prepared to move launching nose to the rear of site, remove panel pin from nose roller.

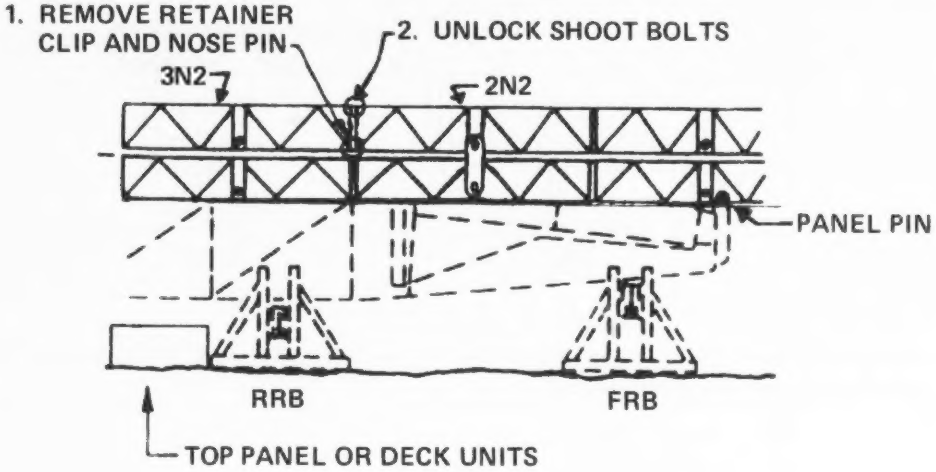
(c) Move launching nose to the rear until the next anchorage tube is slightly behind nose roller.


3N2 (UPPER)
ANCHORAGE TUBE
RRB
FRB

2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

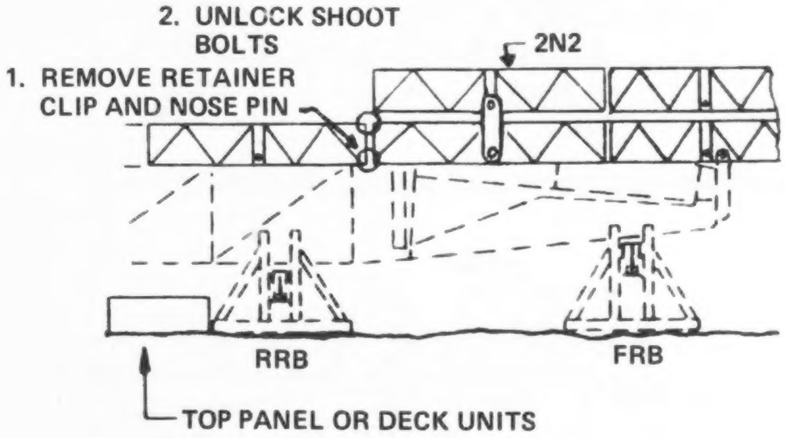
(d) Put panel pin through nose roller and launching nose.


1. REMOVE RETAINER CLIP AND NOSE PIN
2. UNLOCK SHOOT BOLTS
3N2
2N2
PANEL PIN
RRB
FRB
TOP PANEL OR DECK UNITS

(e) Remove retainer clip and nose pin from upper 3N2 and 2N2 nose sections.

(f) Unlock shoot bolts in upper 3N2 nose section.

(g) Remove upper 3N2 nose section.


2. UNLOCK SHOOT BOLTS
2N2
1. REMOVE RETAINER CLIP AND NOSE PIN
RRB
FRB
TOP PANEL OR DECK UNITS

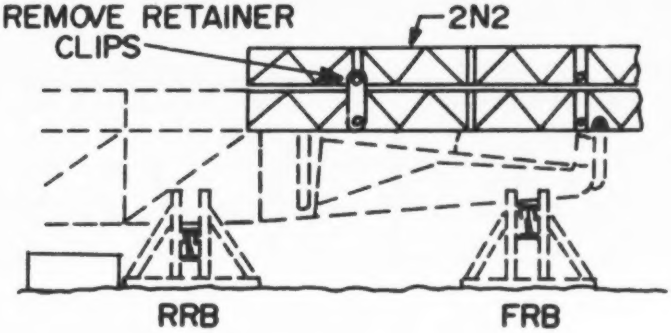
(h) Remove retainer clip and nose pin from lower 3N2 and 2N2 nose sections.

(i) Unlock shoot bolts in lower 3N2 nose section.

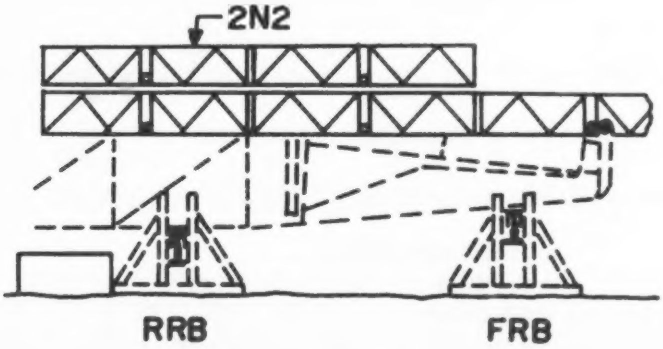
(j) Remove lower 3N2 nose section.

2-12. DISASSEMBLY (Continued)

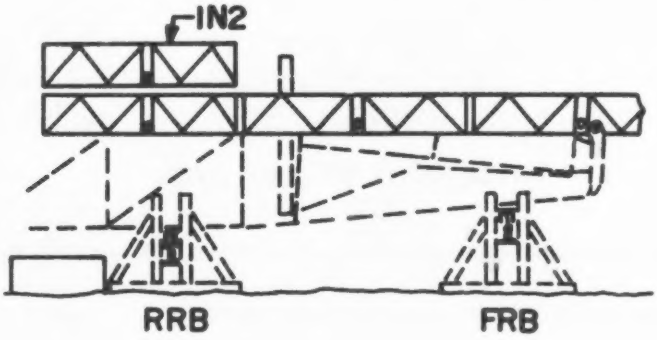
Step 2.a. Disassembly Procedures (Continued).


REMOVE RETAINER CLIPS
2N2
RRB
FRB

(k) Remove retainer clip from headless pins in launching nose link. Remove links and headless pin from upper 2N2 nose section.



(l) Repeat steps (b) thru (h) to remove upper and lower 2N2 nose sections.



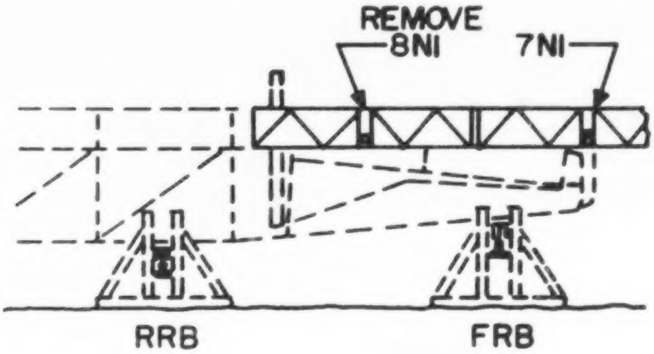
(m) Repeat steps (b) thru (h) to remove upper and lower 1N2 nose sections.

2-12. DISASSEMBLY (Continued)

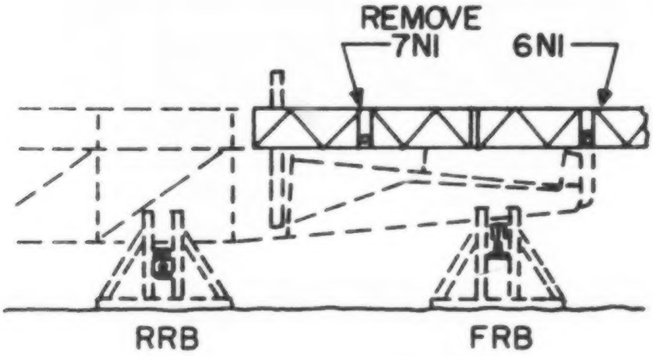
Step 2.a. Disassembly Procedures (Continued).

For 2E + 18 thru 2E + 22 bay bridges, PROCEED TO STEP 2.a. 114.

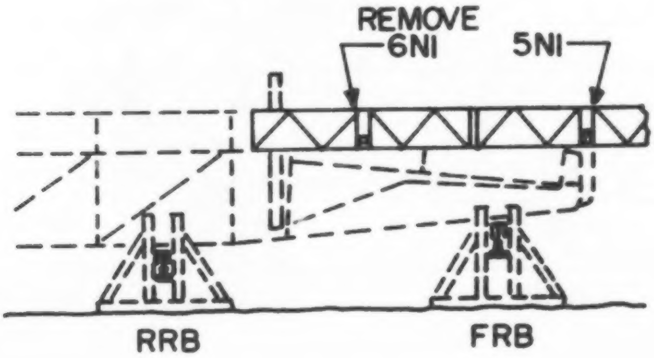
111 Remove eighth nose section (8N1).


REMOVE
8NI
7NI
RRB
FRB

112 Remove seventh nose section (7N1).


REMOVE
7NI
6NI
RRB
FRB

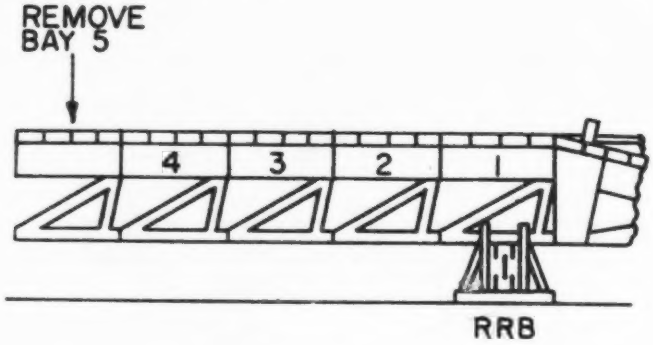
113 Remove sixth nose section (6N1).


REMOVE
6NI
5NI
RRB
FRB

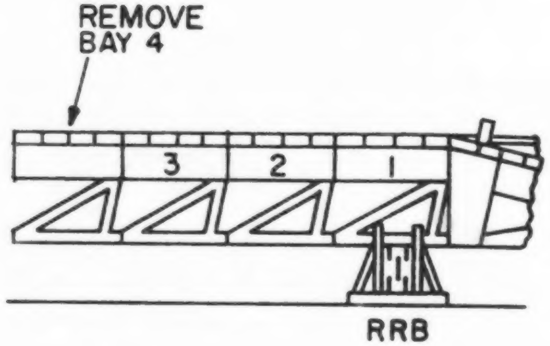
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

114 Remove bay 5.

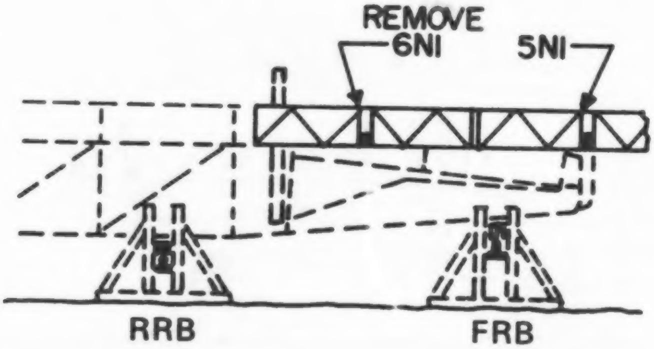

REMOVE
BAY 5
4
3
2
1
RRB

115 Remove bay 4.


REMOVE
BAY 4
3
2
1
RRB

For 2E + 13 thru 2E + 17 bay bridges, PROCEED TO STEP 2.a. 117.

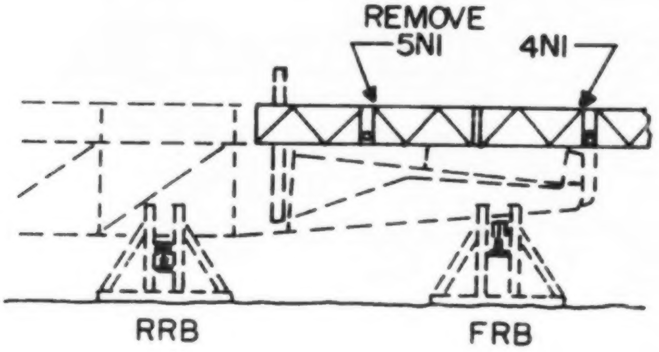
116 Remove sixth nose section (6N1).


REMOVE
6NI
5NI
RRB
FRB

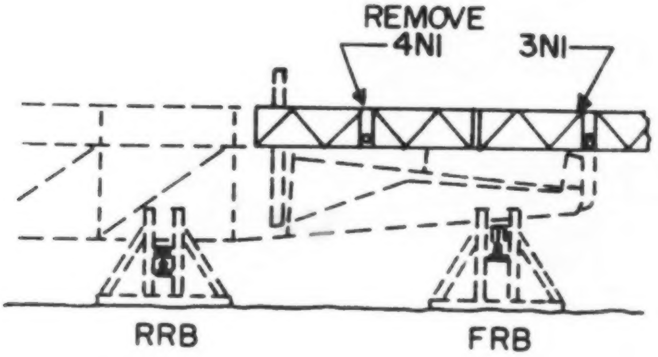
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

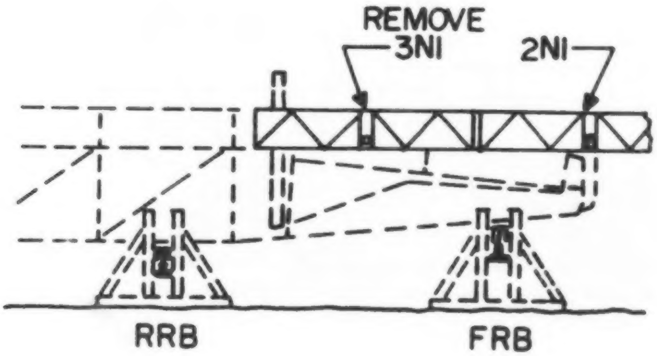
117 Remove fifth nose section (5N1).


REMOVE
5NI
4NI
RRB
FRB

118 Remove fourth nose section (4N1).


REMOVE
4NI
3NI
RRB
FRB

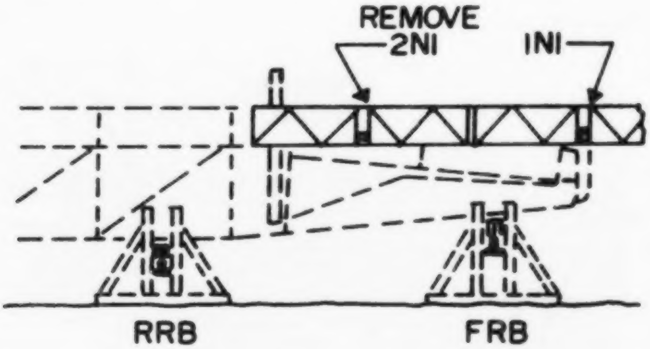
119 Remove third nose section (3N1).


REMOVE
3NI
2NI
RRB
FRB

120 Remove second nose section (2N1).

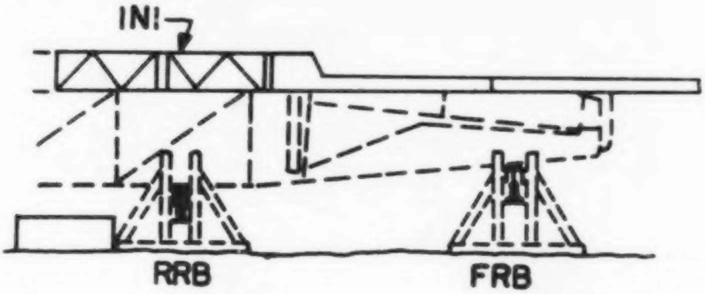
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

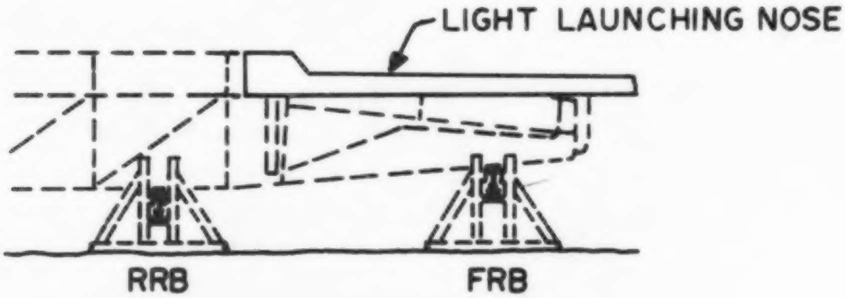

REMOVE
2NI
INI
RRB
FRB

121 Remove LRP from tip of launching nose.

122 Remove first nose section (1N1).



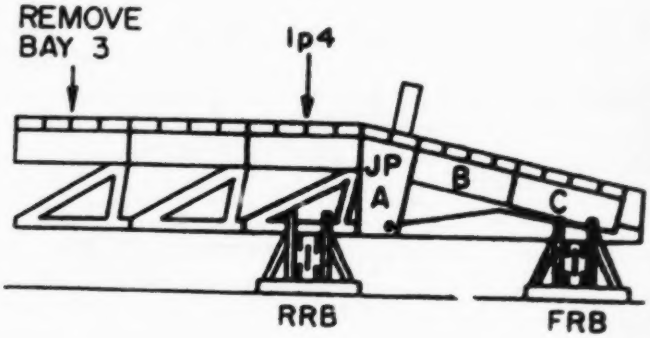
123 Remove light launching nose from nose roller and LNCG. Disassemble light launching nose on the ground behind LNCG.


LIGHT LAUNCHING NOSE
RRB
FRB

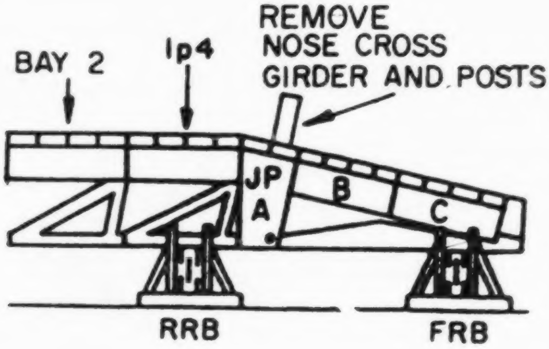
2-12. DISASSEMBLY (Continued)

Step 2.a. Disassembly Procedures (Continued).

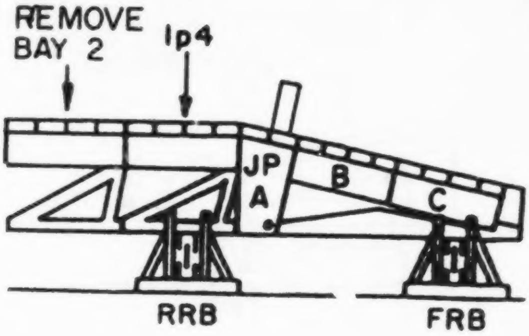
124 Remove bay 3.


REMOVE
BAY 3
Ip4
JP
A
B
C
RRB
FRB

125 Remove LNCG and posts.


BAY 2
Ip4
REMOVE
NOSE CROSS
GIRDER AND POSTS
JP
A
B
C
RRB
FRB

126 Remove nose roller from the BSB.

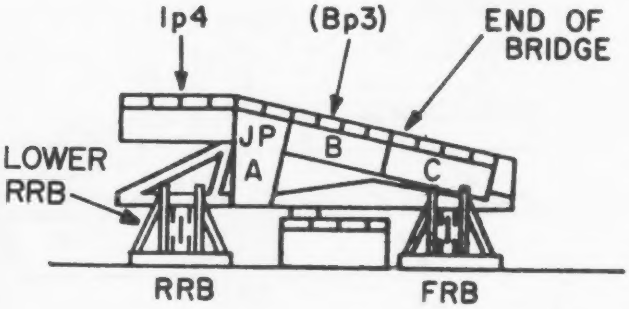

REMOVE
BAY 2
Ip4
JP
A
B
C
RRB
FRB

127 Remove bay 2.

2-12. DISASSEMBLY (Continued)

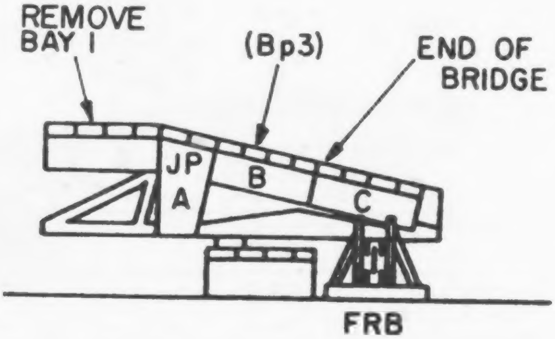
Step 2.a. Disassembly Procedures (Continued).

128 Operate jacks in roller beams to lower both roller beams. RRB should be free from under bay 1.

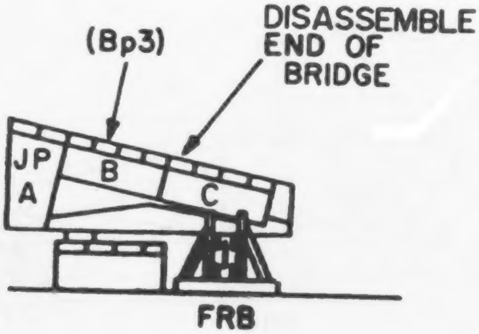

Ip4
(Bp3)
END OF BRIDGE
LOWER RRB
JP
A
B
C
RRB
FRB

129 Slide RRB from under bay 1 and disassemble.

130 Remove bay 1.


REMOVE BAY I
(Bp3)
END OF BRIDGE
JP
A
B
C
FRB

131 Disassemble end of bridge.


(Bp3)
DISASSEMBLE END OF BRIDGE
JP
A
B
C
FRB

132 Disassemble FRB.

133 Clear site of all components.

2-13. DISASSEMBLY ON THE ORIGINAL FAR BANK

a. This paragraph provides the additional or modified steps needed to disassemble the link reinforced MGB on the original far bank.

b. This paragraph must be used with paragraph 2-12 to disassemble bridges on the original far bank.

NOTE

The original far bank becomes the new near bank, and the original near bank becomes the new far bank. Also the bays of the bridge must be renumbered from the new far bank. Using a 2E + 22 bay as an example, what was bay 22 is now bay 1, and what was bay 1 is now bay 22.

All reference to near or far bank from this point will be referring to the new near bank and the new far bank respectively.

Step 1. Preparation for Disassembly.

a. If pumps, hoses and water are available, the bridge, erection, and link components should be washed before loading them on pallets. When washing is to be done, the parts are taken from the bridge to the washing area, then loaded on the proper pallet.

b. If washing can not be done, the parts are loaded on the proper pallet.

c. Move all launching nose components to the far bank, and all the roller beam components to the near bank. All pallets must be moved to near bank.

Step 2. Disassembly Procedures.

a. Additional or modified steps needed are as follows:

NOTE

If bridge had been emplaced with minimum bearing under the original far bank end of bridge it will have to be "skidded". "Skidding" a bridge is a procedure used to get enough bridge [4.5 ft (1.4.m)] over the bank so the jacking roller beam can be put under it safely.

2-13. DISASSEMBLY ON THE ORIGINAL FAR BANK (Continued)

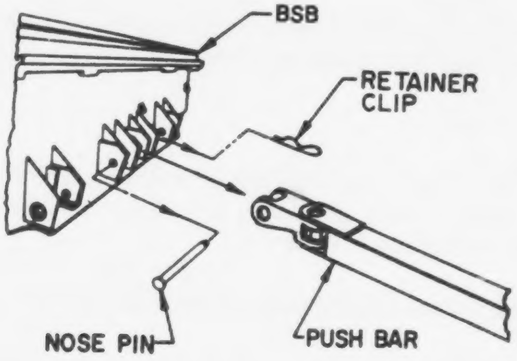
Step 2.a. Disassembly Procedures (Continued).

1 To "skid" the bridge.

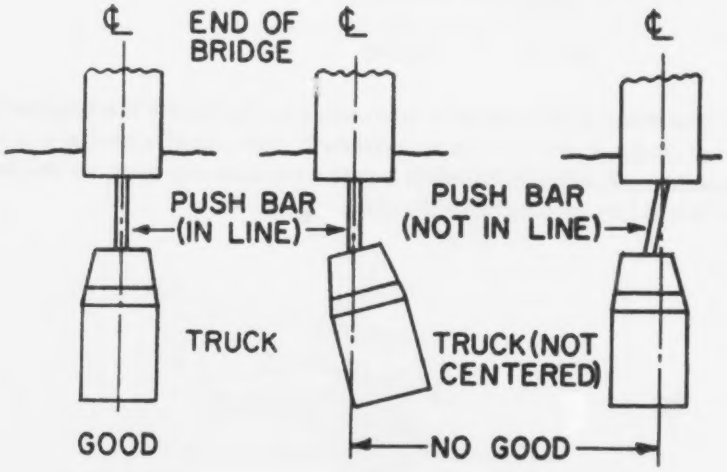
NOTE

If the end of bridge has sunk into the ground, it will be necessary to jack up the end of bridge so packing can be placed under the ETP.

(a) Pin short push bar to center bracket of bankseat beam with nose pin. Secure nose pin with retainer clip.


BSB
RETAINER CLIP
NOSE PIN
PUSH BAR

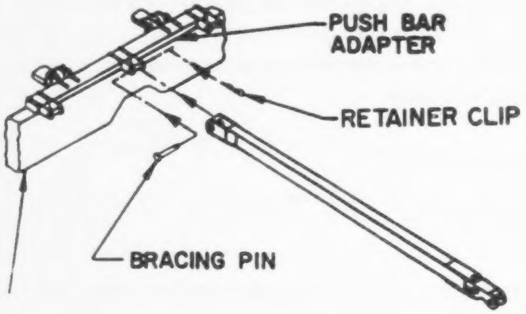
(b) Move vehicle into position near rear of bridge. Ensure that vehicle is in a straight line with the bridge and centered over the centerline.


℄
END OF BRIDGE
℄
℄
PUSH BAR (IN LINE)
PUSH BAR (NOT IN LINE)
TRUCK
TRUCK(NOT CENTERED)
GOOD
NO GOOD

2-13. DISASSEMBLY ON THE ORIGINAL FAR BANK (Continued)

Step 2.a. Disassembly Procedures (Continued).

(c) Pin push bar to adapter with bracing pin and secure pin with retainer clip.


PUSH BAR ADAPTER
RETAINER CLIP
BRACING PIN

(d) Back vehicle up, "skidding" bridge over ground (or packing) until 4.5 ft (1.4 m) of the end of bridge is over the bank. Stop "skidding".

(e) Remove push bar and back vehicle off the site.

2-13. DISASSEMBLY ON THE ORIGINAL FAR BANK (Continued)

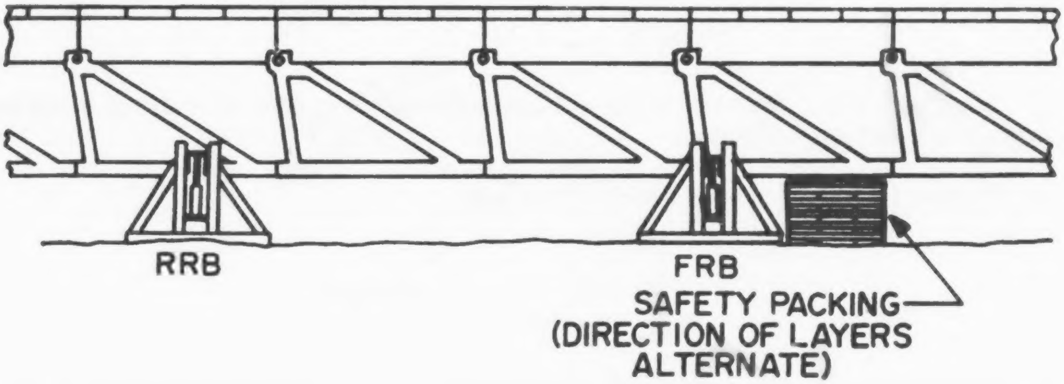
Step 2.a. Disassembly Procedures (Continued).

NOTE

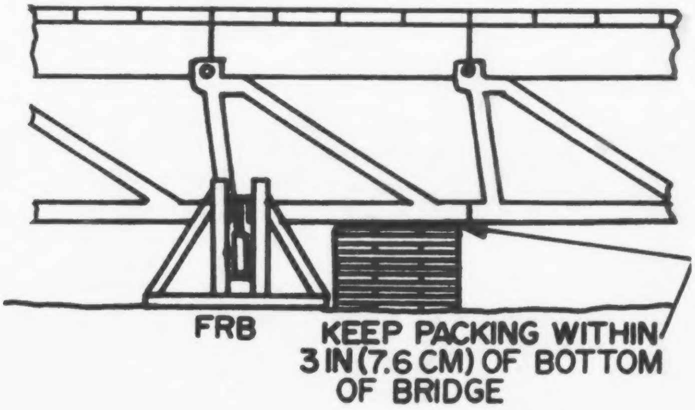
Safety packing under the bridge in front of the FRB is used as a safety stop to prevent the loss of the bridge during removal of bridge bays. Safety packing will be put in after the first de-launch is made and will remain in place until the last boom is made.

2 Place safety packing in front of FRB.

(a) Stack packing in front of FRB.


RRB
FRB
SAFETY PACKING (DIRECTION OF LAYERS ALTERNATE)

(b) Keep height of packing within 3 in (7.6 cm) of bottom of bridge girder.


FRB
KEEP PACKING WITHIN 3 IN (7.6 CM) OF BOTTOM OF BRIDGE

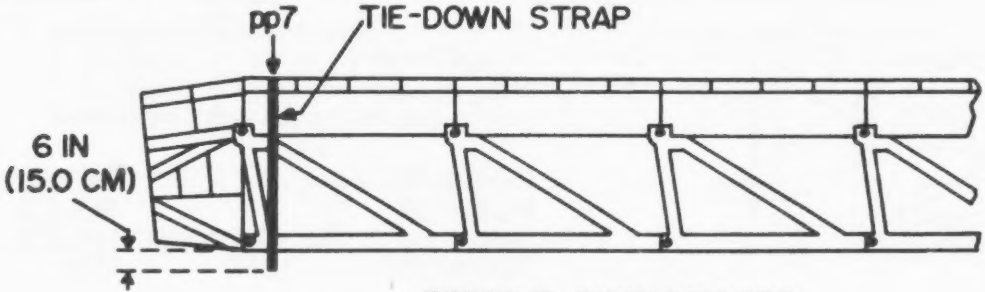
2-13. DISASSEMBLY ON THE ORIGINAL FAR BANK (Continued)

Step 2.a. Disassembly Procedures (Continued).

3 Removing junction panel.

(a) Remove sway braces in the last three bays of bridge.

(b) Place one 10,000 lb cargo tie-down strap around panel point 7 of the last bay. This strap must be adjusted so as to provide 6 in (15.0 cm) of slack below bottom panel.

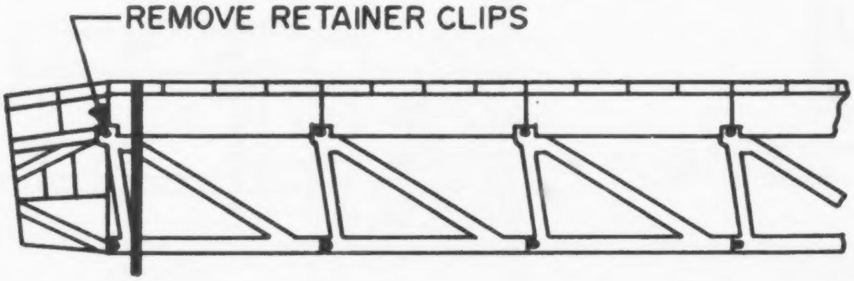


REMOVE SWAY BRACES

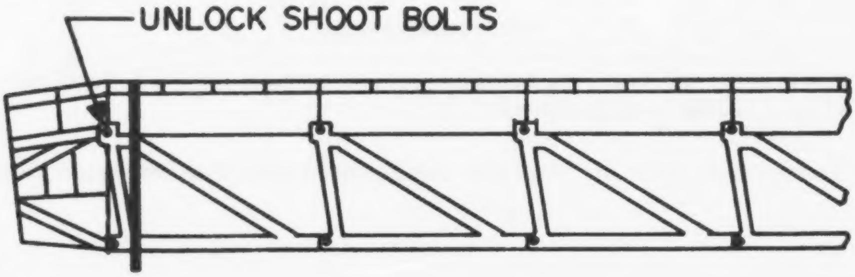
NOTE

Placement of this tie-down strap prevents the bottom panel from dropping too far. This strap reduces the chances of injuring personnel and damaging the panel.

(c) Remove retainer clips from headless pin in junction panel.



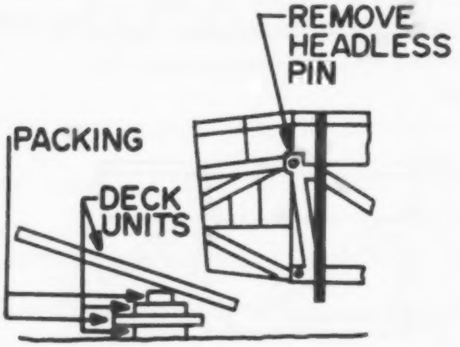
(d) Unlock shoot bolts of bottom panel in last bay of bridge.

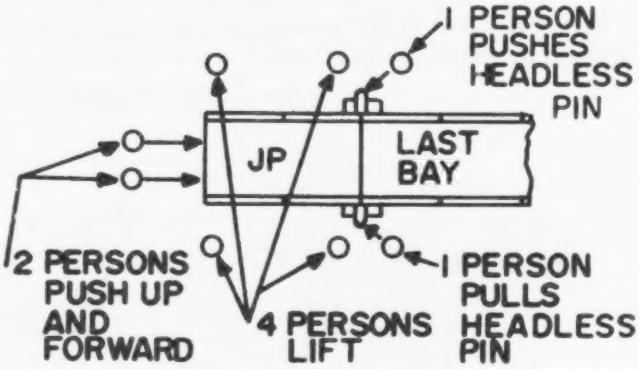


2-13. DISASSEMBLY ON THE ORIGINAL FAR BANK (Continued)

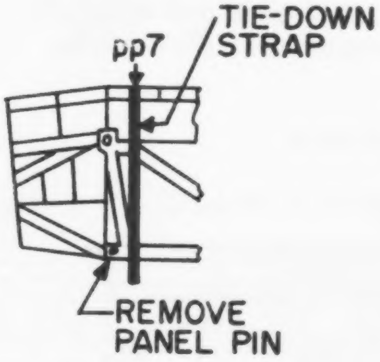
Step 2.a. Disassembly Procedures (Continued).

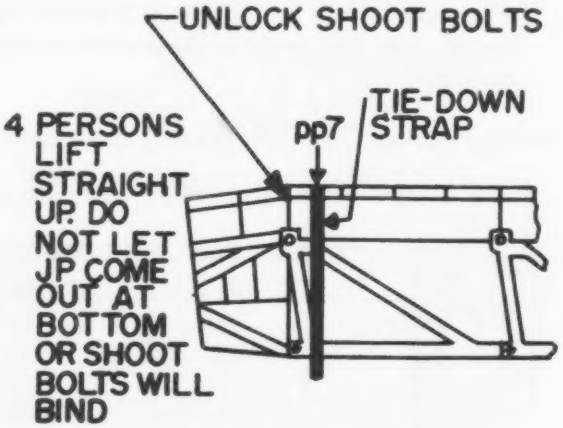
(e) Using deck units or six personnel as shown, lift junction panel and remove headless pin from upper pin hole in junction panel.


REMOVE HEADLESS PIN
PACKING
DECK UNITS


1 PERSON PUSHES HEADLESS PIN
JP
LAST BAY
2 PERSONS PUSH UP AND FORWARD
4 PERSONS LIFT
1 PERSON PULLS HEADLESS PIN

(f) Remove panel pin from bottom pin hole in junction panel.


pp7
TIE-DOWN STRAP
REMOVE PANEL PIN


UNLOCK SHOOT BOLTS
4 PERSONS LIFT STRAIGHT UP. DO NOT LET JP COME OUT AT BOTTOM OR SHOOT BOLTS WILL BIND
pp7
TIE-DOWN STRAP

WARNING

Bottom panel will drop into strap as junction panel is removed. Keep feet and legs clear of bottom panel.

(g) Four personnel lift junction panel and unlock shoot bolts. Remove junction panel from the end of bridge.

2-13. DISASSEMBLY ON THE ORIGINAL FAR BANK (Continued)

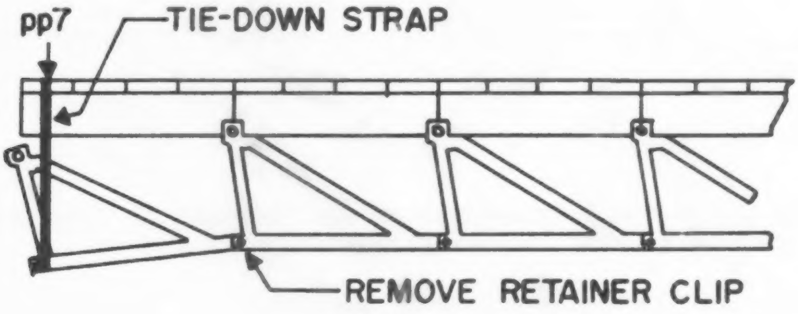
Step 2.a. Disassembly (Continued).

4 Removing bottom panels.

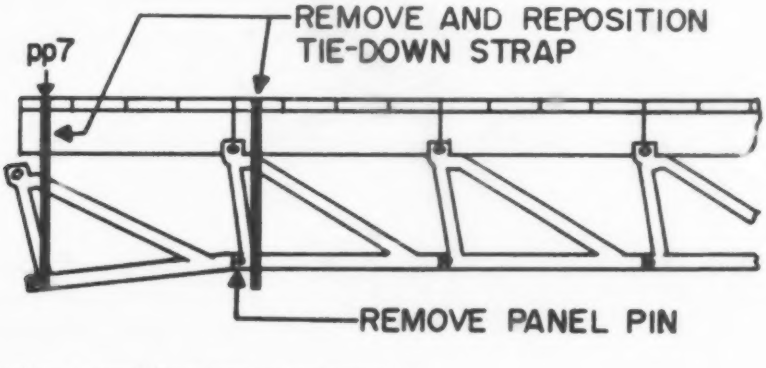
NOTE

If this bottom panel is the bottom panel of a bay to be removed after the next boom, do not remove it at this time. An example of this is when disassembling 2E + 13 thru 2E + 15 bay bridges, the end of bridge through bay 13 is to be removed at 10p0 over RRB. During removal of bay 13 top panel, bay 12 bottom panel will drop into the tie-down strap. Do not remove bay 12 bottom panel until the next boom is performed, leave it resting in the tie down strap during the boom to 4p7.

(a) Remove retainer clip from panel in bottom panel.


pp7
TIE-DOWN STRAP
REMOVE RETAINER CLIP

(b) Four personnel lift bottom panel, while one person unhooks and removes the tie-down strap, and another removes the panel pin.


REMOVE AND REPOSITION TIE-DOWN STRAP
pp7
REMOVE PANEL PIN

(c) Move bottom panel from under top panel.

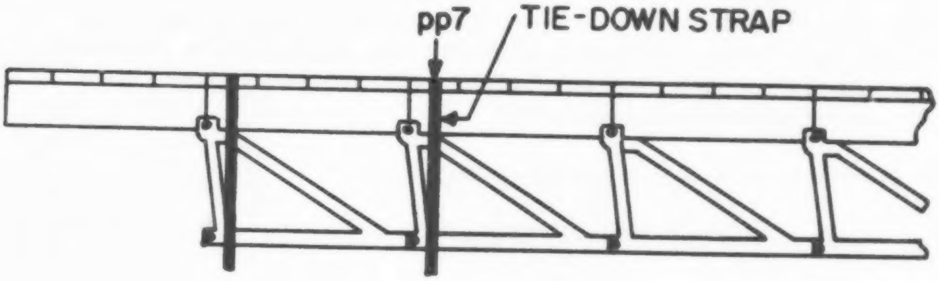
2-13. DISASSEMBLY ON THE ORIGINAL FAR BANK (Continued)

Step 2.a. Disassembly Procedures (Continued).

(d) Tie-down strap is hooked around panel point of the next unstrapped bay.

5 Removing top panels.

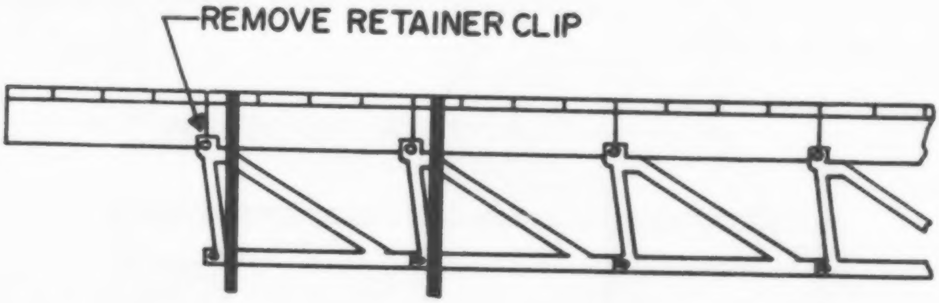
(a) Place a second tie-down strap around panel point 7 of the next unstrapped bay.



NOTE

From this point on, these two straps will be moved along the bridge girder so there is always two straps around the last two bays of bridge.

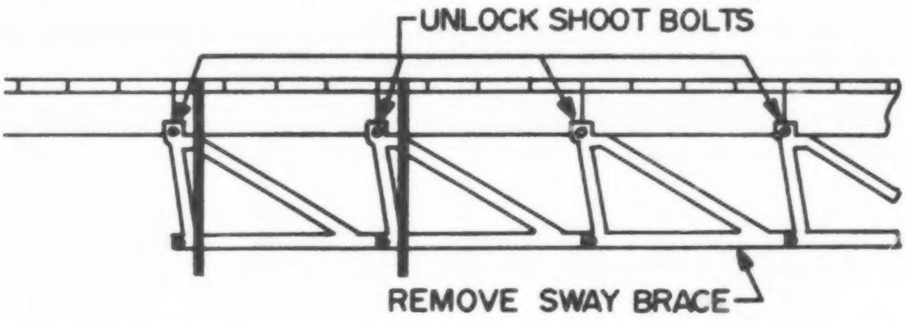
(b) Remove retainer clip from panel pin in last top panel.



(c) Unlock shoot bolts of the last four bottom panels on each side of bridge.

2-13. DISASSEMBLY ON THE ORIGINAL FAR BANK (Continued)

Step 2.a. Disassembly Procedures (Continued).

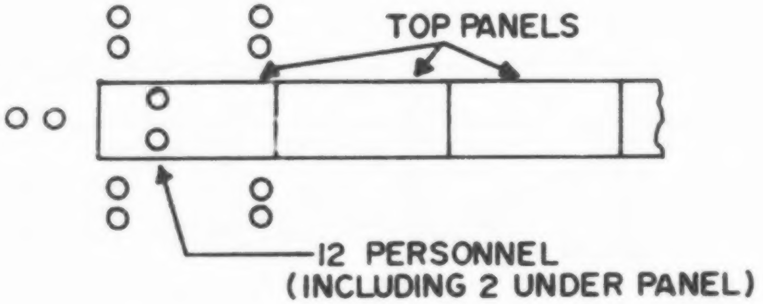

UNLOCK SHOOT BOLTS
REMOVE SWAY BRACE

NOTE

It is necessary to unlock four shoot bolts so as to allow enough slack in the girder to permit releasing the bottom panel upper jaws from the panel pin in the rear most top panel. Ensure that four shoot bolts are unlocked before trying to lift the rear most top panel.

(d) Remove the next sway brace in the bridge.

(e) Using 12 personnel (as shown), lift rearmost top panel until bottom panel falls free of panel pin in top panel.


TOP PANELS
12 PERSONNEL
(INCLUDING 2 UNDER PANEL)

NOTE

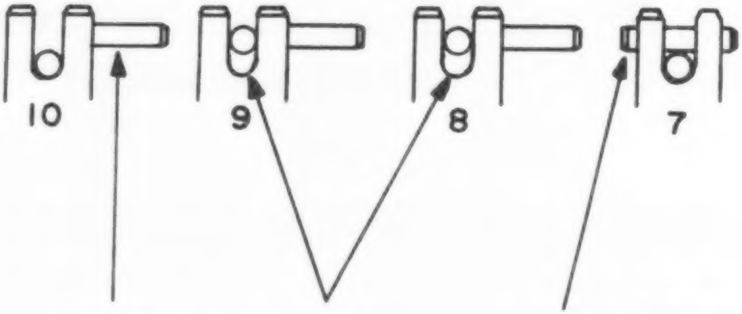
The panel pins in the upper jaws may not settle back down after the top panel is lifted (as shown in example). If this happens, it will not be possible to unlock the next shoot bolt.

2-13. DISASSEMBLY ON THE ORIGINAL FAR BANK (Continued)

Step 2.a. Disassembly Procedures (Continued).

To unlock the next shoot bolt (bay 7), temporarily lock the shoot bolt in bottom panel 10 and lift top panel 11 until the pins in 9 and 8 resettle. Unlock shoot bolt in bays 10 and 7.

EXAMPLE: After release of top panel 12 and bottom panel 11. Remove these panels and prepare to release top panel 11.

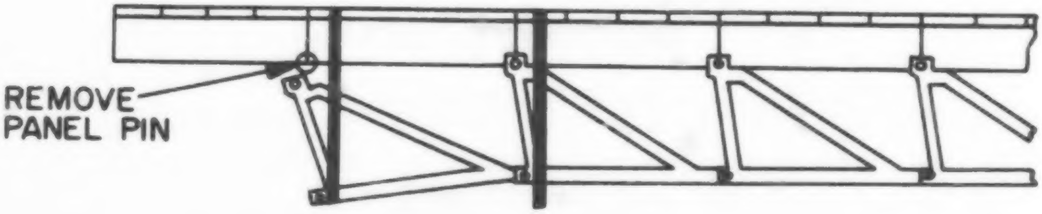


Temporarily lock this bolt and lift top panel 11 to get pins resettled.

Did not settle back down in upper jaws.

This shoot bolt will not unlock

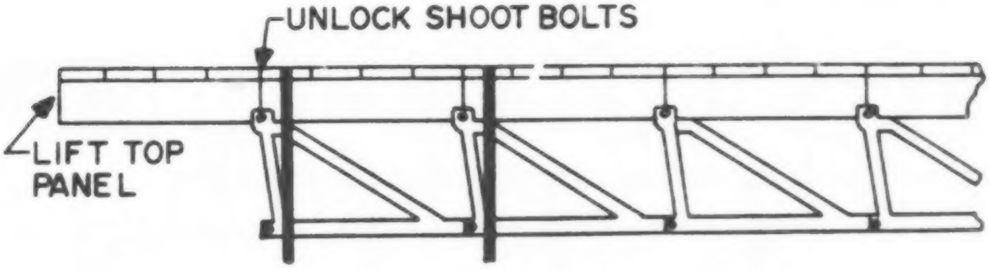
(f) Let top panel down and remove panel pin.



(g) Lift top panel, unlock shoot bolts in top panel and remove panel.

2-13. DISASSEMBLY PROCEDURES (Continued)

Step 2.a. Disassembly Procedures (Continued).



NOTE

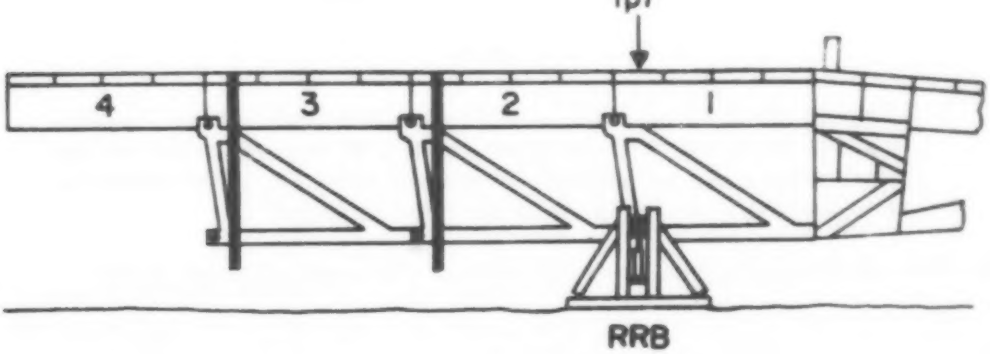
As this top panel is removed, ensure that four bottom panel shoot bolts are unlocked. As the next bottom panel is removed, unhook and move the tie-down strap to the next unstrapped bay.

6 Additional booming of bridge.

NOTE

Two additional booms are required because of the way the bottom panels are removed and the pin in the last top panel is removed. These booms are performed between the last two booms given in Table 2-14.

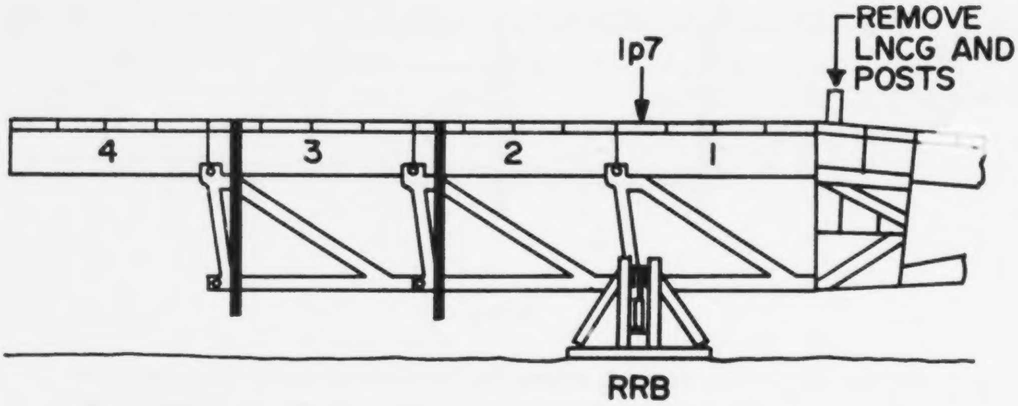
(a) Boom to 1p7 over RRB. Disassemble the bridge until the top panel in bay 4 is reached. DO NOT REMOVE bay 4 top panel.



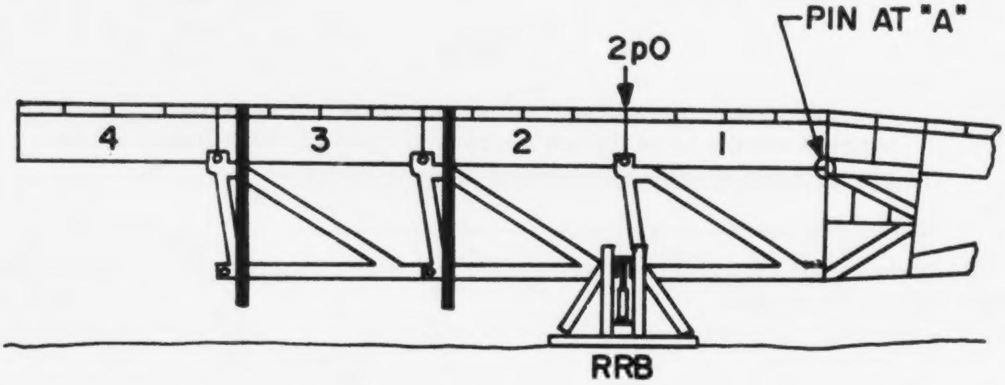
2-13. DISASSEMBLY ON THE ORIGINAL FAR BANK (Continued)

Step 2.a. Disassembly Procedures (Continued).

(b) Remove the launching nose, cross girder, posts and nose roller.



(c) Boom to 2p0 over RRB. This boom is needed to remove the pin at "A".



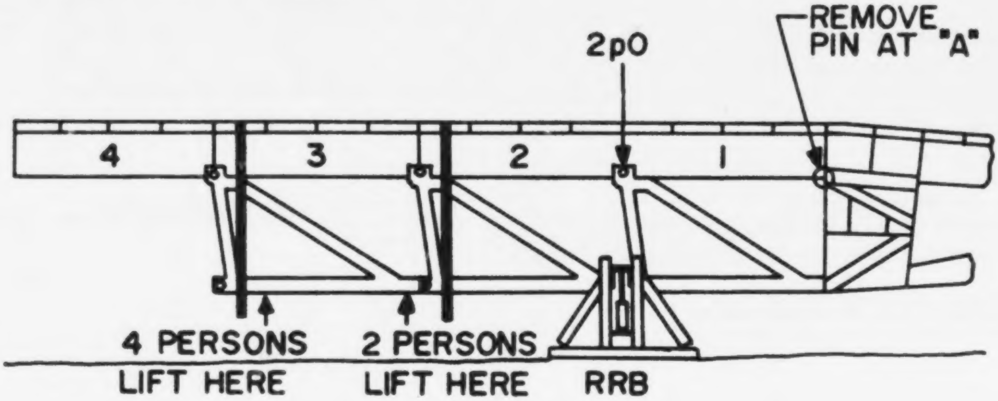
NOTE

The panel pin in the upper pin jaws of the junction panel and last top panel is called the pin at "A". This panel pin must be removed before the top panel of bay 4 can be removed. The removal of the pin at "A" serves the same purpose as unlocking the bottom panel shoot bolt.

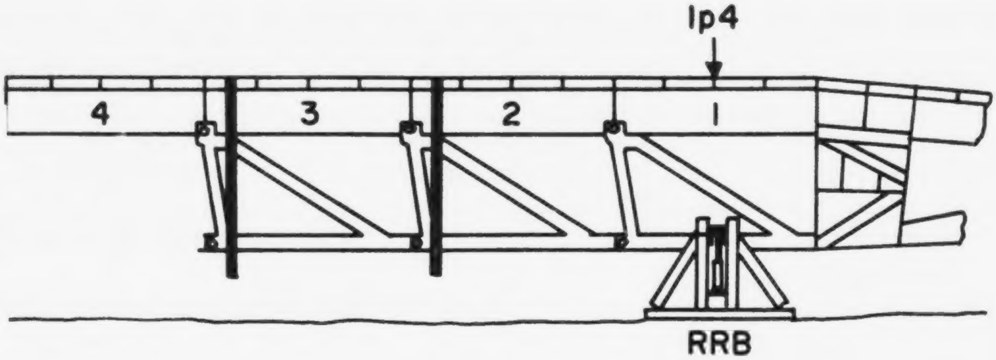
(d) With six personnel lifting the bottom panel of bay 3, remove the pin at "A".

2-13. DISASSEMBLY ON THE ORIGINAL FAR BANK (Continued)

Step 2.a. Disassembly Procedures (Continued).


2pO
REMOVE PIN AT "A"
4
3
2
1
4 PERSONS LIFT HERE
2 PERSONS LIFT HERE
RRB

(e) Boom to 1p4 and continue disassembly of bridge.


1p4
4
3
2
1
RRB

best copy available

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

	Paragraph	Page
Launching In High Winds	2-14	2-242
Launching Up Steep Slopes	2-15	2-243

OVERVIEW

The purpose of this section is to discuss adverse conditions undr which the bridge may have to be launched and the methods of controlling the launch.

2-14. LAUNCHING IN HIGH WINDS

a. When launching with the building area sheltered and the gap exposed, wind loads may cause the bridge to rotate about the LRB/CRB until the bridge is jacked down onto the far bank.

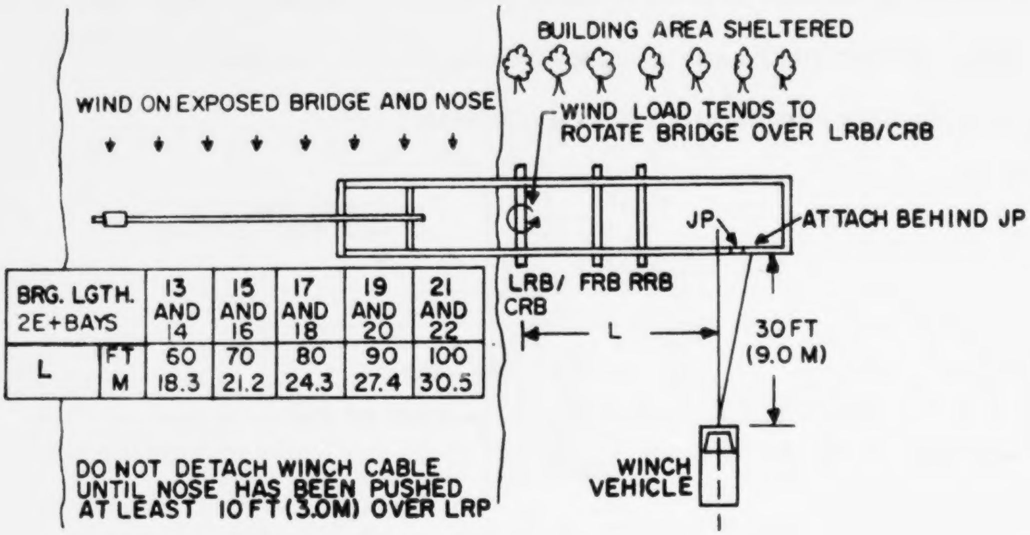
b. Bridges must not be launched in more severe conditions than those given below.

BRIDGE LENGTH	MAXIMUM CONDITION DURING LAUNCHING	
	WIND SPEED	CROSS FALL ON BRIDGE
2E + 13 thru 2E + 16	40 mph (65 km/ph)	no cross fall
2E + 17 thru 2E + 22	30 mph (48 km/ph)	no cross fall

★ LRB/CRB must be approximately [within 3 in (7.6 cm)] level when the launching nose has touched the far bank.

c. When launching bridges in winds over 30 mph (48 km/ph) it is necessary to attach a vehicle winch cable at right angles to the bridge as shown below.

2-14. LAUNCHING IN HIGH WINDS (Continued)


BUILDING AREA SHELTERED
WIND ON EXPOSED BRIDGE AND NOSE
WIND LOAD TENDS TO ROTATE BRIDGE OVER LRB/CRB
JP
ATTACH BEHIND JP
LRB/ CRB
FRB
RRB
L
30 FT (9.0 M)
WINCH VEHICLE
DO NOT DETACH WINCH CABLE UNTIL NOSE HAS BEEN PUSHED AT LEAST 10 FT (3.0M) OVER LRP

BRG. LGTH. 2E+BAYS		13 AND 14	15 AND 16	17 AND 18	19 AND 20	21 AND 22
L	FT	60	70	80	90	100
	M	18.3	21.2	24.3	27.4	30.5

d. The winch cable is used to prevent the tail of the bridge from moving sideways during launch. By taking in as the tail approaches the vehicle and paying it out as it moves away the bridge is held over the centerline.

e. The winch cable is not detached from the tail of bridge until at least 10 ft. (3.0 m) of the launching nose has passed the landing roller pedestal.

f. During the launching, the far bank crew should:

(1) Steady the nose on the launching roller pedestal until at least 20 ft. (6.0 m) of the launching nose has passed the landing roller pedestal.

(2) Be ready to lower the landing roller pedestal jack if any sign of instability develops.

2-15. LAUNCHING UP STEEP SLOPES

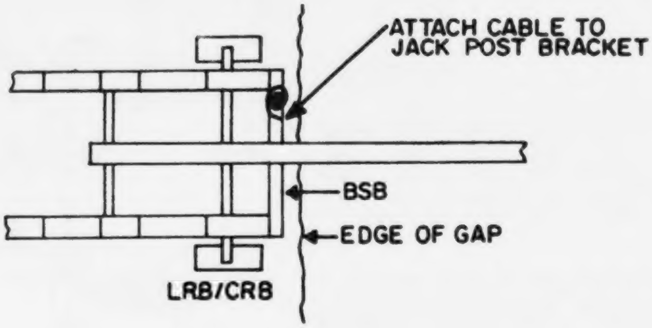
a. In launching up slopes of 1 in 30 to 1 in 20, it may become necessary to complete the launch with the aid of a hauling cable. It will also be necessary to use a vehicle and a push bar during launch.

2-15. LAUNCHING UP STEEP SLOPES (Continued)

b. The following procedure describes a method of launching a bridge up a steep slope.

1 Before booming attach cable to far bank bankseat beam on near bank.

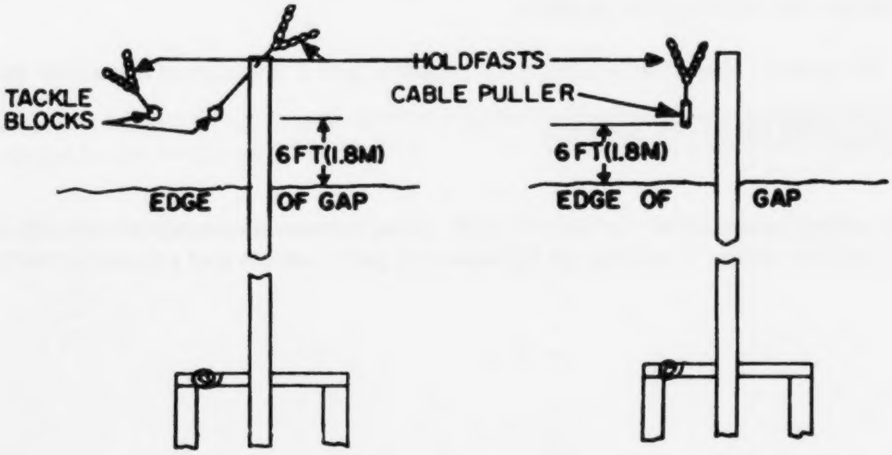
2 Loop remaining slack of cable and place on nose unit.


ATTACH CABLE TO JACK POST BRACKET
BSB
EDGE OF GAP
LRB/CRB

3 Begin booming bridge with the aid of a vehicle and push bar.

4 After nose touches down on far bank, carry two holdfasts and two block and tackle over to far bank if a vehicle is to be used. If cable puller is to be use, only one holdfast is needed.

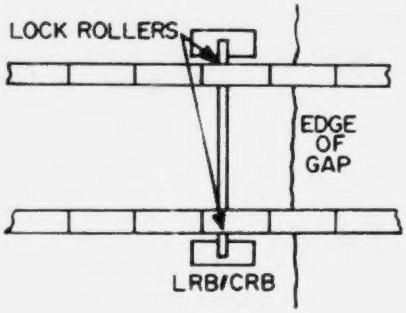
5 To one side of bridge centerline, attach block and tackle units or cable pullers to holdfasts. Units should be placed a minimum of 6 feet (1.8 m) from edge of bank.


HOLDFASTS
TACKLE BLOCKS
CABLE PULLER
6 FT (1.8M)
EDGE OF GAP
6 FT (1.8M)
EDGE OF GAP

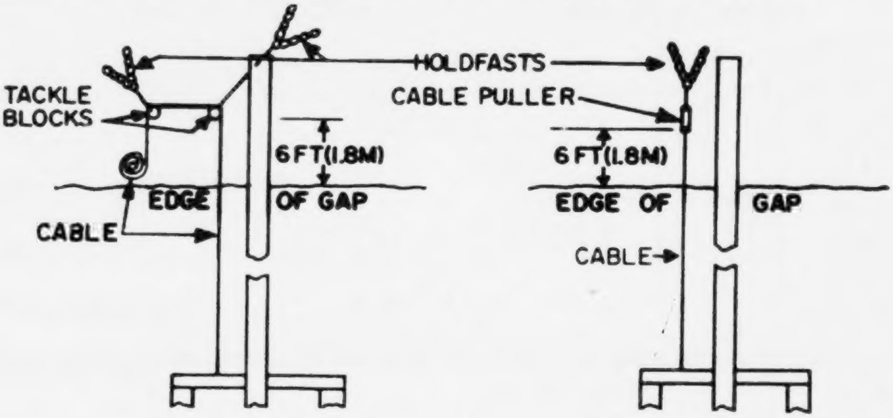
2-15. LAUNCHING UP STEEP SLOPES (Continued)

6 Place nose unit on landing roller pedestal.

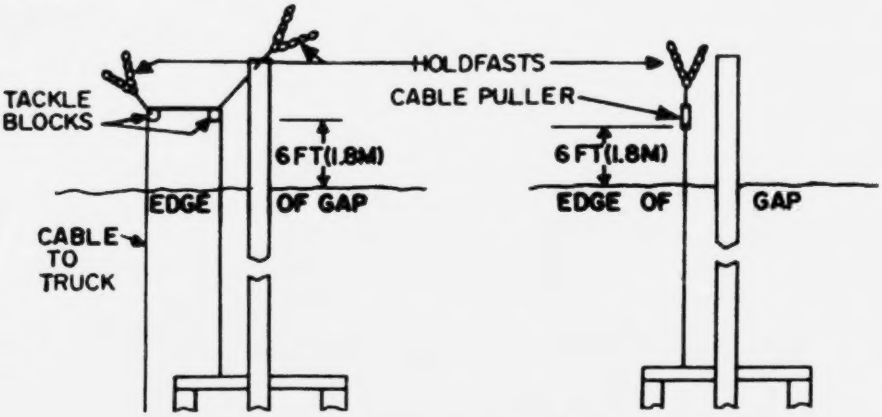
7 Lock LRB/CRB rollers.


LOCK ROLLERS
EDGE OF GAP
LRB/CRB

8 Put cable through block and tackle units (for vehicle assisted launch), or into cable puller.


HOLDFASTS
TACKLE BLOCKS
CABLE PULLER
6 FT(1.8M)
6 FT(1.8M)
EDGE OF GAP
EDGE OF GAP
CABLE
CABLE

9 Connect other end of cable to winch vehicle on home bank or if using cable puller, operate it from the far bank.

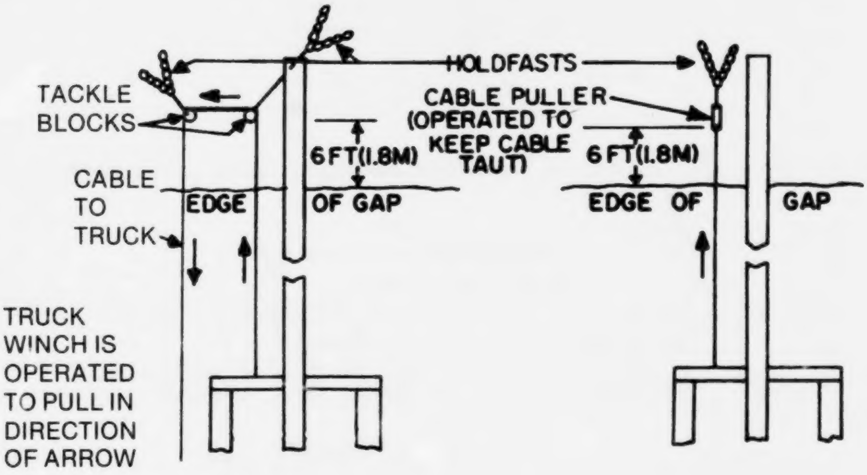

HOLDFASTS
TACKLE BLOCKS
CABLE PULLER
6 FT(1.8M)
6 FT(1.8M)
EDGE OF GAP
EDGE OF GAP
CABLE TO TRUCK

2-15. LAUNCHING UP STEEP SLOPES (Continued)

10 Make sure vehicle and push bar are connected to last bay or end of bridge.

11 Unlock LRB/CRB rollers.

12 Continue to boom in the following manner: At the same time and at the same speed as push bar vehicle pushes bridge forward, winch vehicle pulls in the opposite direction, or cable puller is operated to keep cable taut.


HOLDFASTS
TACKLE BLOCKS
CABLE PULLER (OPERATED TO KEEP CABLE TAUT)
6 FT(1.8M)
6 FT(1.8M)
CABLE TO TRUCK
EDGE OF GAP
EDGE OF GAP
TRUCK WINCH IS OPERATED TO PULL IN DIRECTION OF ARROW

13 After each part of launch make sure LRB/CRB roller are locked before detaching push bar from the end of bridge.

14 Disconnect cable from bankseat beam after the far bank end of bridge has been lowered to ground.

Section V. TRANSPORT AND PALLETIZATION

	PARAGRAPH	PAGE
Loading Pallet on Trailer (Load LRS-2)	2-16 f.	2-268
Loading Pallet on Trucks (Load LRS-1)	2-16 h.	2-270
Loading Parts in Baskets	2-16 c.	2-247
Pallet Load LRS-1	2-16 d. (1)	2-249
Pallet Load LRS-2	2-16 d. (2)	2-258

2-16. TRANSPORT AND PALLETIZATION REQUIRED

a. Transport. All the parts needed to build and launch the MGB are transported to and from the bridge site on 5 ton dump trucks and 4 ton 4 wheel trailers. These trucks and trailers are also used to transport personnel, supplies and other equipment when the bridge has been off-loaded.

b. Palletization. This section gives procedures for loading the link reinforcement components on pallets, loading the pallets on truck and trailer, and removing pallets from truck and trailer. Procedures for loading of the bridge and erection parts can be found in Transport and Palletization of TM 5-5420-212-12 Chapter 2.

c. Loading parts in baskets. There are four different basket loads for the link reinforcing set. The parts, quantities and weights are listed in Table 2-15. To load baskets, place the parts into baskets in the order given.

(1) Basket Load LRS-A (1 each).

(a) 20 nose pins

(b) 11 bracing pins

(c) 2 guard ropes

(d) 3 anti-flutter tackle

(e) 10 light tackle

(f) 2 hammers

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

(2) Basket Load LRS-B (1 each)

- (a) 20 nose pins
- (b) 11 bracing pins
- (c) 2 guard ropes
- (d) 2 anti-flutter tackle
- (e) 10 light tackle
- (f) 2 hammers

(3) Basket Load LRS-C (1 each)

- (a) 2 launching nose links
- (b) 2 capsill pins
- (c) 1 jack seat
- (d) 1 equipment bag (w/75 retainer clips)
- (e) 1 ratchet wrench
- (f) 1 jack handle

(4) Basket Load LRS-D (1 each)

- (a) 1 launching nose link
- (b) 1 capsill pin
- (c) 1 jack seat
- (d) 1 equipment bag (w/75 retainer clips)
- (e) 1 ratchet wrench
- (f) 1 jack handle

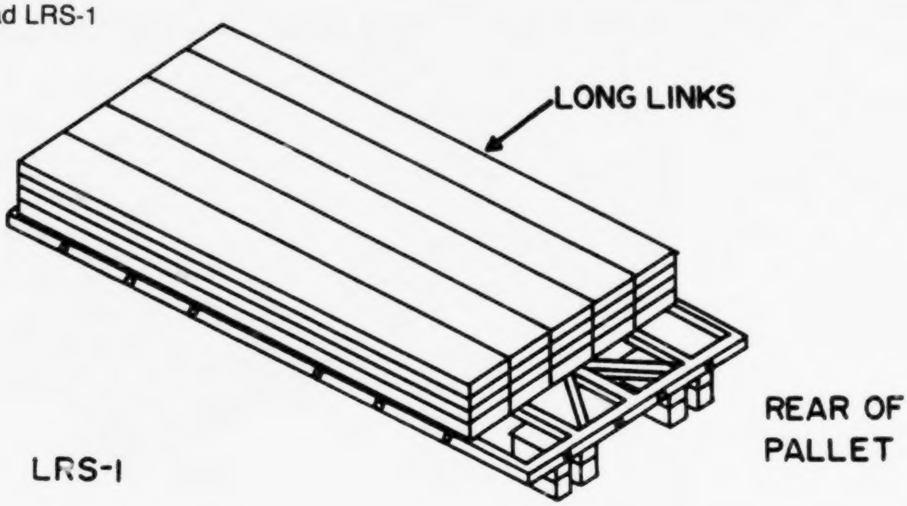
NOTE

When loaded, baskets are to be carried by four persons.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

d. Loading Parts on Pallets. There are two different pallet loads for the link reinforcing set. The parts, quantities and weights are listed in Table 2-16. To load pallets, perform the steps as described.

(1) Pallet Load LRS-1

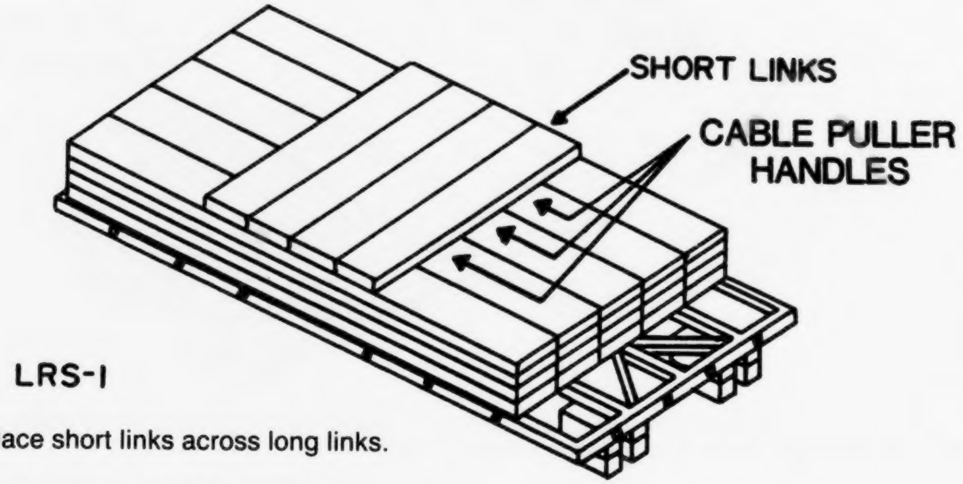


Step 1. Place long links on pallet.

a. Long links are placed side by side, 5 wide.

b. Stack links 4 high, overlap (sides) each layer.

c. End of links will be flush with the front end of pallet.



Step 2. Place short links across long links.

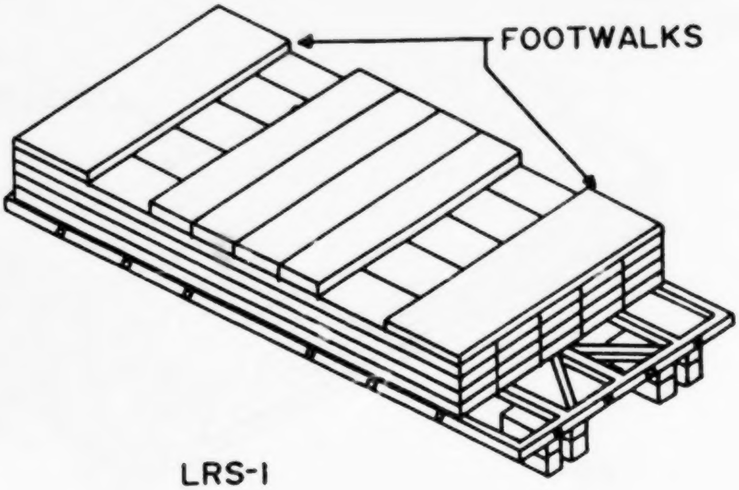
a. Short links should be side by side.

b. Links should be centered over long links.

c. Place cable puller handles on long links and under short links.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

(1) Pallet Load LRS-1 (Continued)

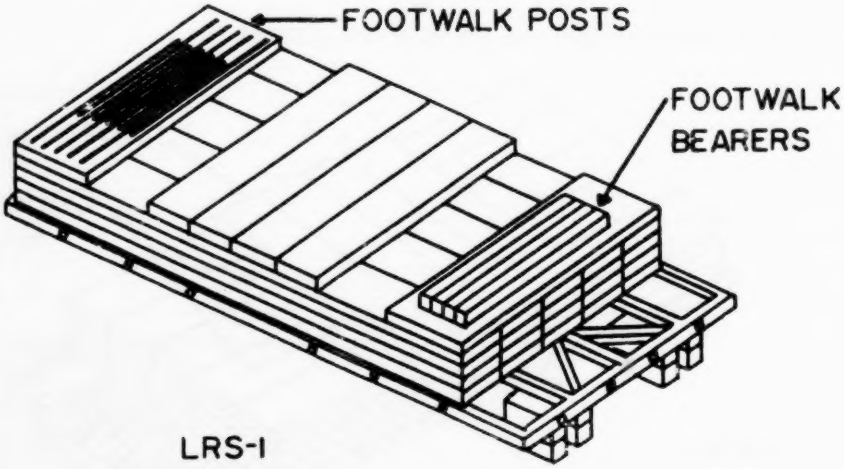


LRS-I

Step 3. Place 2 footwalks on top of long links.

a. Both footwalks are placed on load upside down.

b. Footwalks are placed at each end of links.


FOOTWALK POSTS
FOOTWALK BEARERS

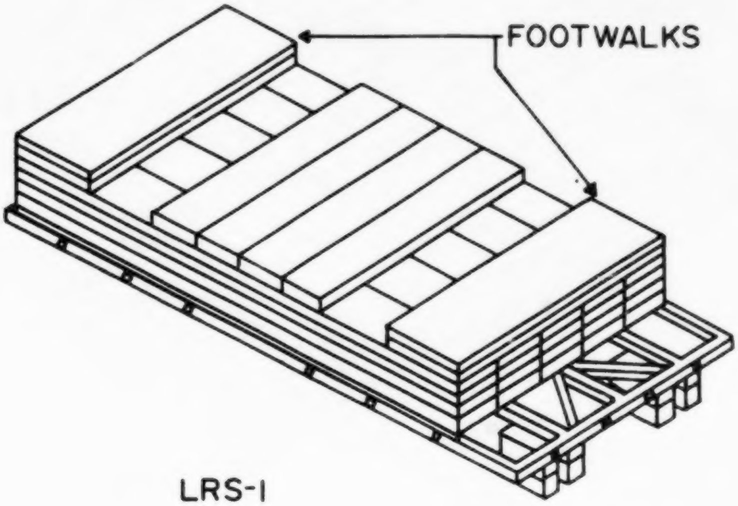
LRS-I

Step 4. Place 10 footwalk posts in footwalk on front of load.

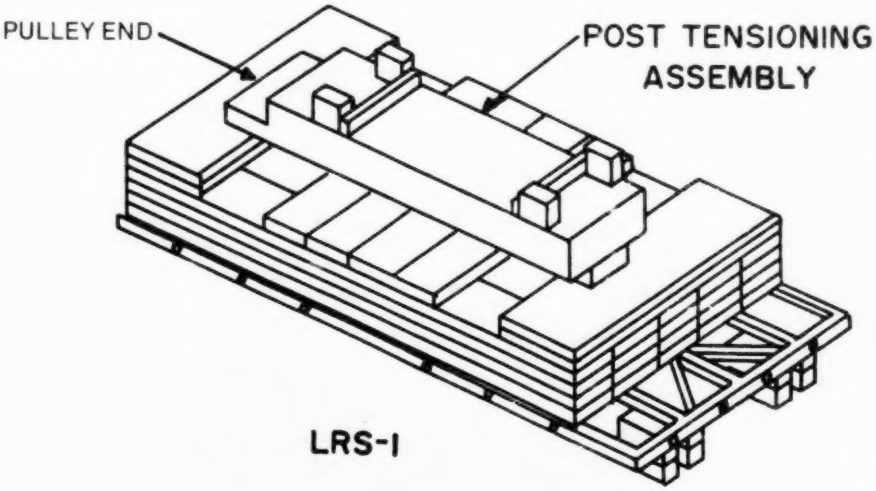
Step 5. Place 4 footwalk bearers in footwalk on rear of load.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

(1) Pallet Load LRS-1 (Continued)


FOOTWALKS
LRS-1

Step 6. Place 2 footwalks on top of other footwalks. These are placed on load right side up.

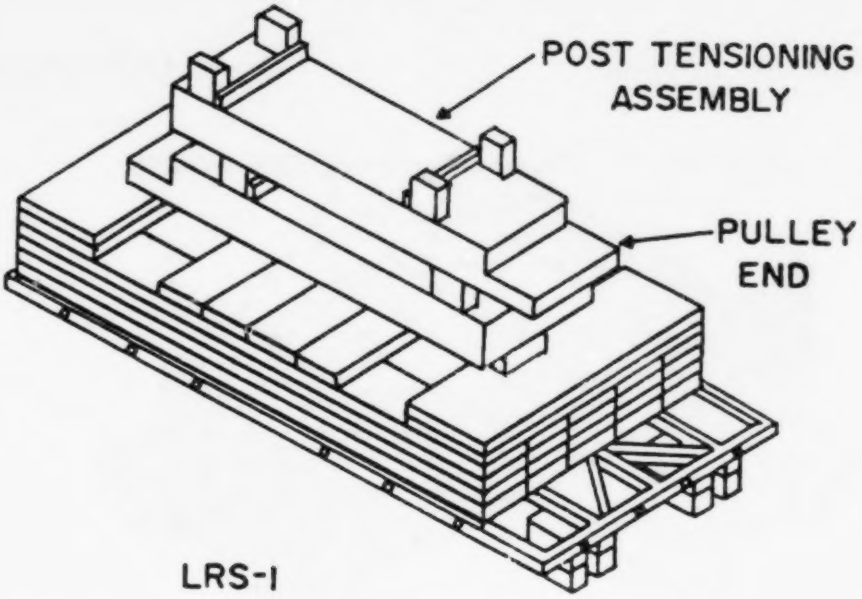

PULLEY END
POST TENSIONING ASSEMBLY
LRS-1

Step 7. Place 1 post tensioning assembly on top of short links and footwalks.

a. Pulley end of assembly faces front of pallet.

b. Assembly is centered over links.

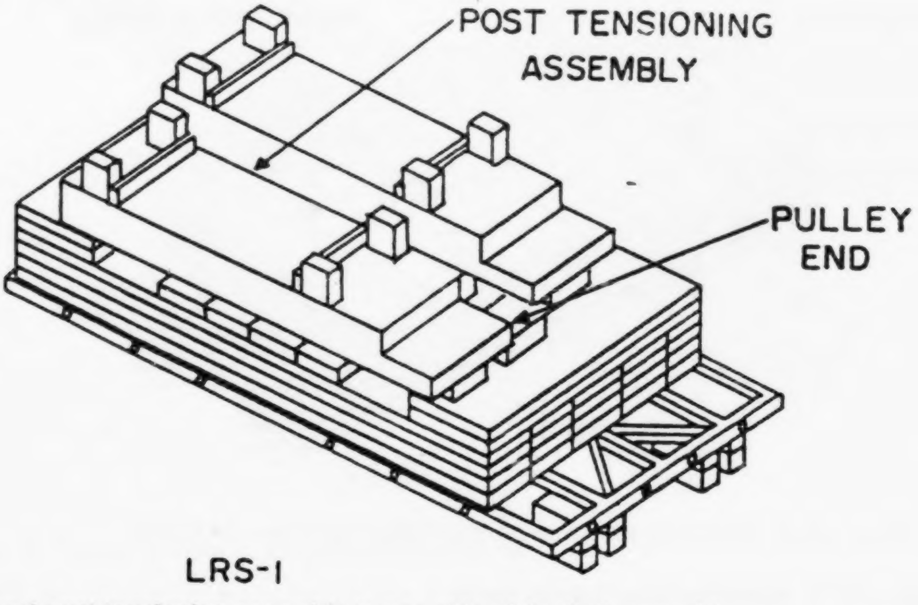
(1) Pallet Load LRS-1 (Continued).


POST TENSIONING ASSEMBLY
PULLEY END
LRS-1

Step 8. Place 1 post tensioning assembly on top of first assembly.

a. Pulley end of assembly faces rear of pallet.

b. Assembly is centered over other assembly.

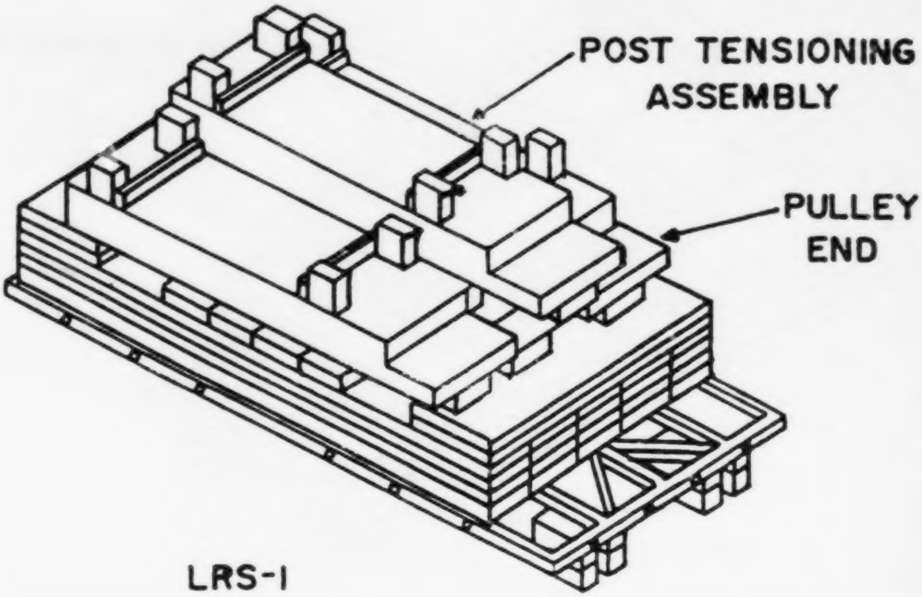

POST TENSIONING ASSEMBLY
PULLEY END
LRS-1

Step 9. Place 1 post tensioning assembly to one side of the first assembly.

a. Pulley end faces rear of pallet.

b. Ensure assembly is tight against first assembly.

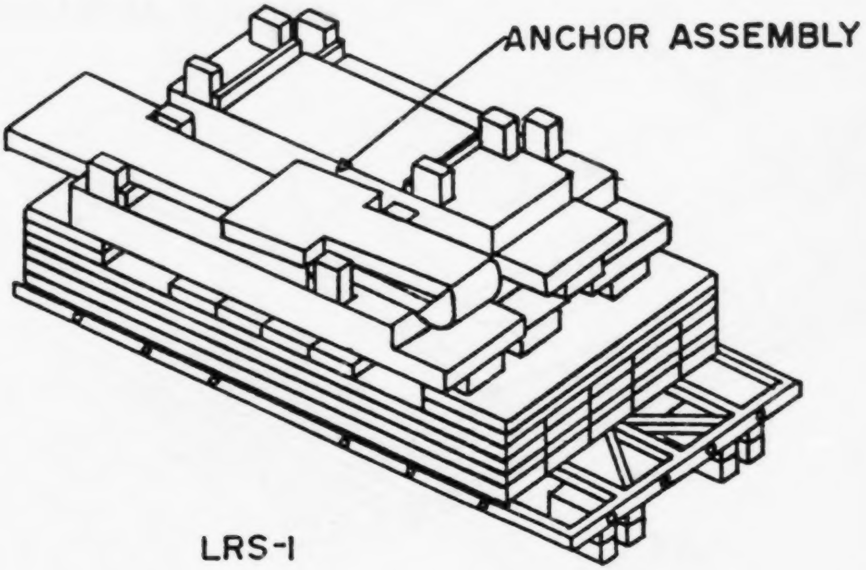
(1) Pallet Load LRS-1 (Continued).


POST TENSIONING ASSEMBLY
PULLEY END
LRS-1

Step 10. Place the last post tensioning assembly on the other side of the first assembly.

a. Pulley end faces rear of pallet.

b. Ensure assembly is tight against first assembly.

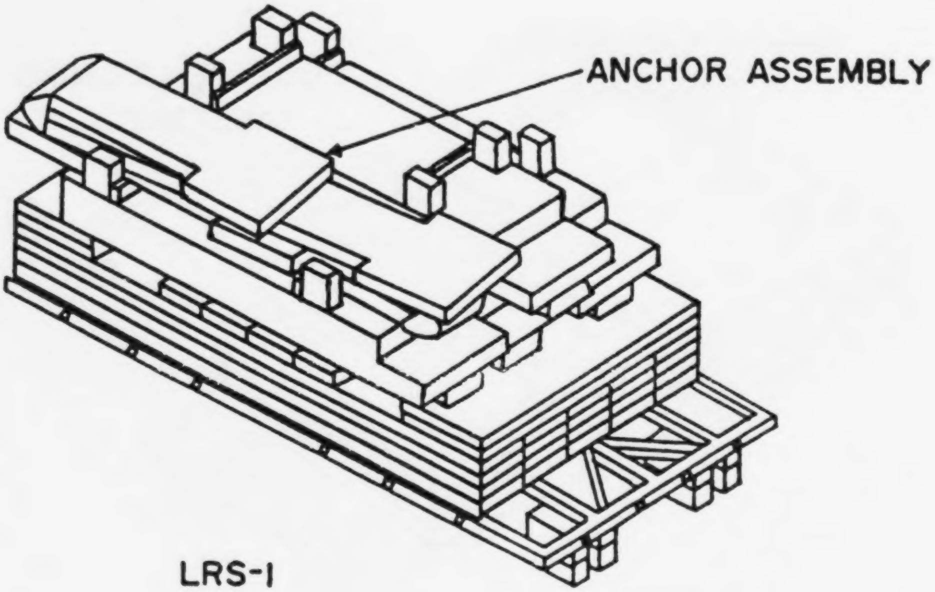

ANCHOR ASSEMBLY
LRS-1

Step 11. Place 1 anchor assembly on top of tensioning assembly.

a. Fork end anchors must be locked in transit position.

b. Junction block faces rear of pallet.

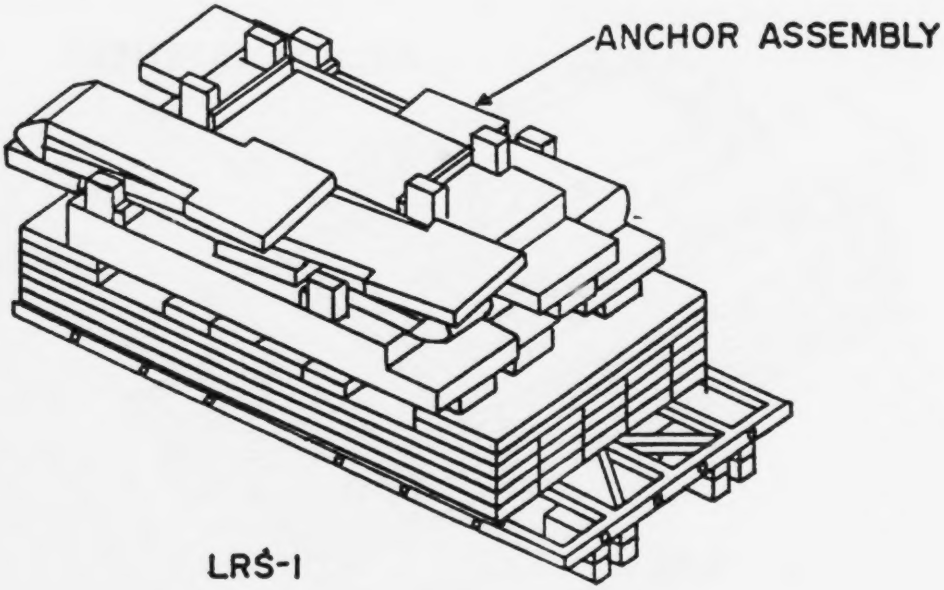
(1) Pallet Load LRS-1 (Continued).


ANCHOR ASSEMBLY
LRS-1

Step 12. Place 1 anchor assembly on top of first assembly.

a. Fork end anchors must be locked in transit position.

b. Junction block faces front of pallet.

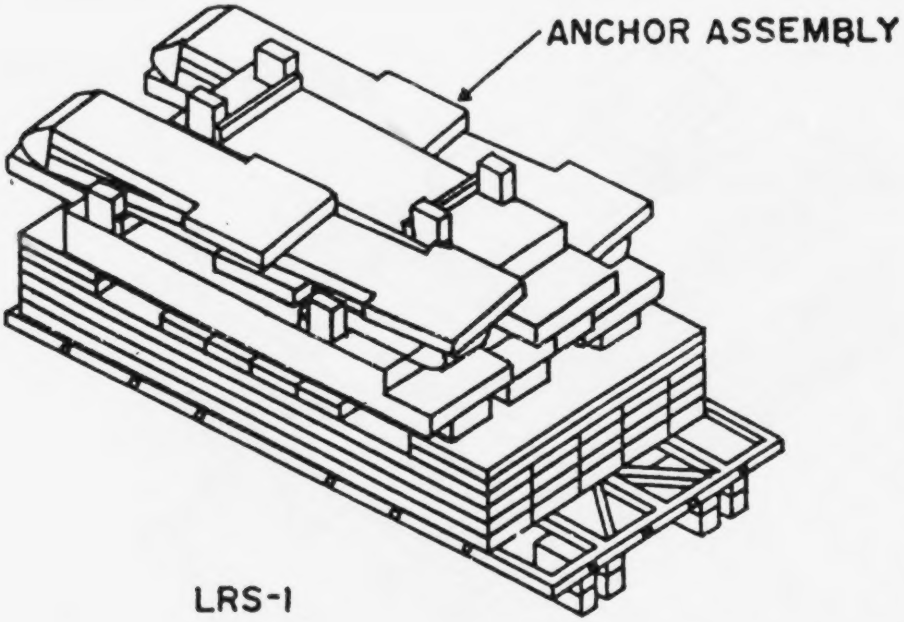

ANCHOR ASSEMBLY
LRS-1

Step. 13. Place 1 anchor assembly on top of tensioning assembly.

a. Fork end anchors must be locked in transit position.

b. Junction block faces rear of pallet.

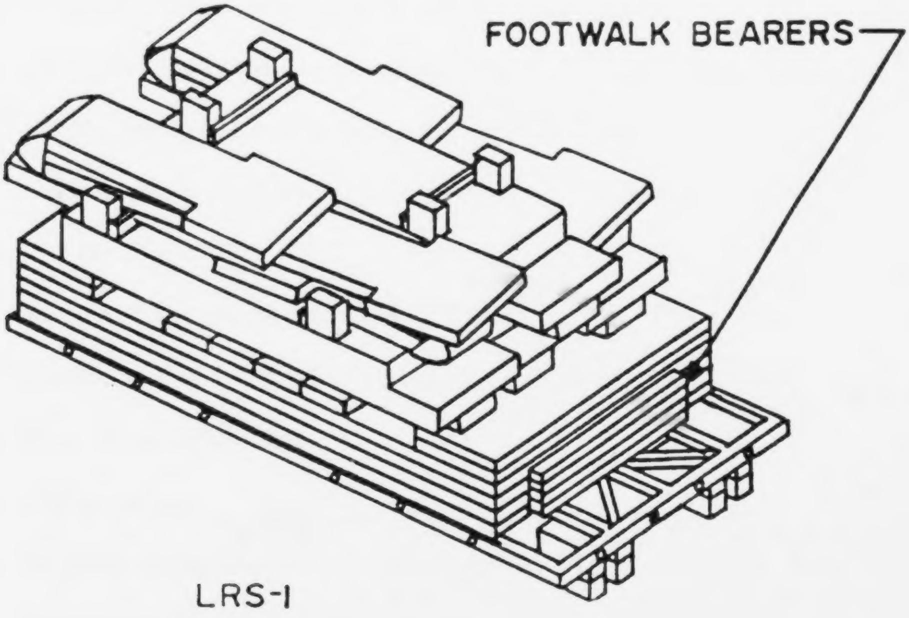
(1) Pallet Load LRS-1 (Continued).


ANCHOR ASSEMBLY
LRS-1

Step 14. Place 1 anchor assembly on top of first assembly.

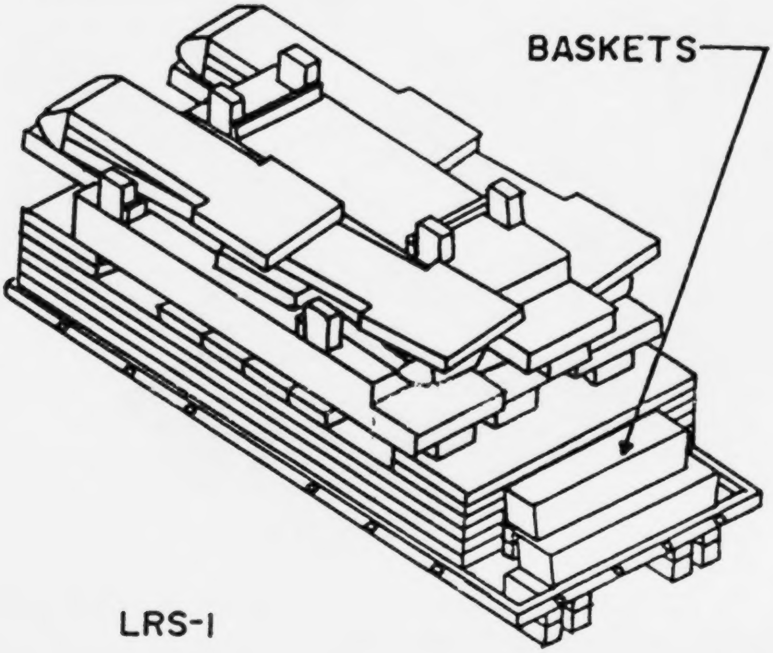
a. Fork end anchors must be locked in transit position.

b. Junction block faces front of pallet.


FOOTWALK BEARERS
LRS-1

Step 15. Place 4 footwalk bearers on pallet behind long links.

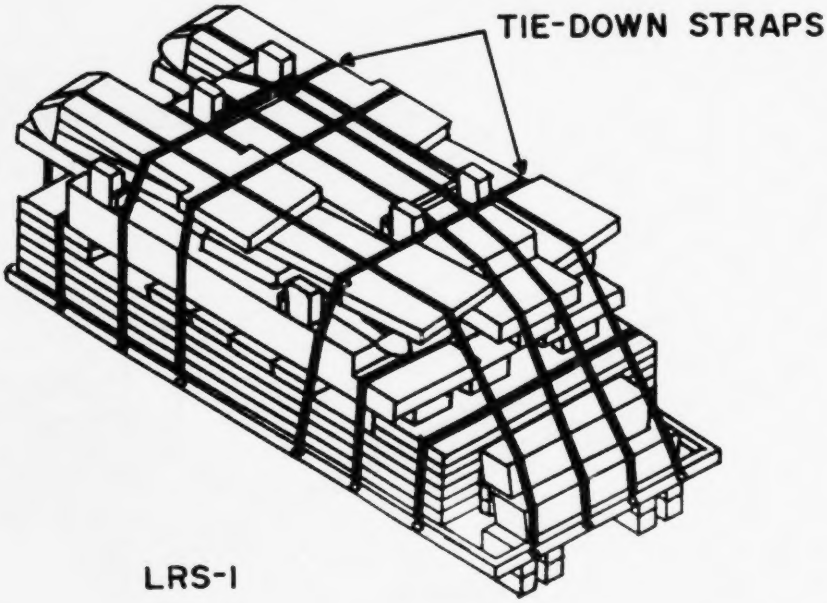
(1) Pallet Load LRS-1 (Continued).



Step 16. Place 2 baskets (LRS-A and B) on rear of pallet against footwalk bearers.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

(1) Pallet Load LRS-1 (Continued)



Step 17. Secure load with 10 10,000 lb. cargo tie-down straps.

a. Place 4 straps lengthwise over pallet load.

b. Ratchet assembly of strap is placed to the rear of pallet.

c. Hook straps to shackles.

d. Tighten straps.

e. Place 6 straps across pallet load.

f. Ratchet assembly of strap is placed on right side of pallet.

g. Hook straps to shackles.

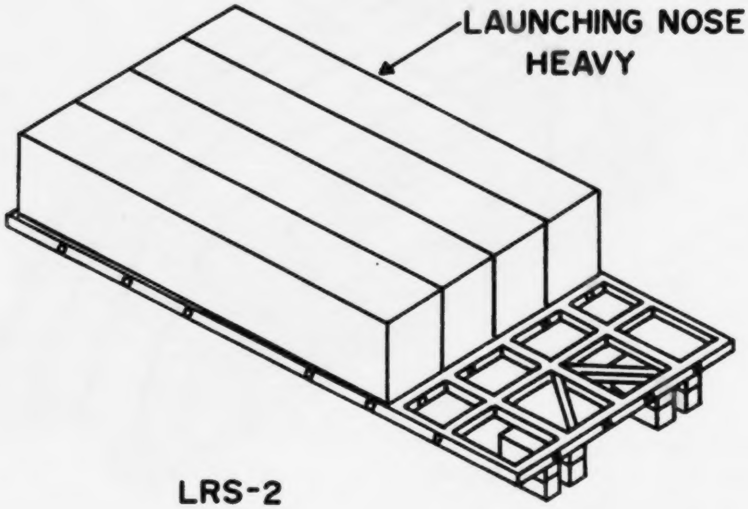
h. Tighten straps.

i. Tie rubber bumper across pallet load near rear of load.

j. Roll or wrap excess strap in a neat manner.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

(2) Pallet Load LRS-2



LRS-2

Step 1. Place 4 launching nose heavy sections on front of pallet.

a. Front of nose sections are placed flush with the front of pallet.

b. Sides of outside nose sections are placed flush with the edge of pallet.

c. Inside nose sections are aligned with outer nose sections.

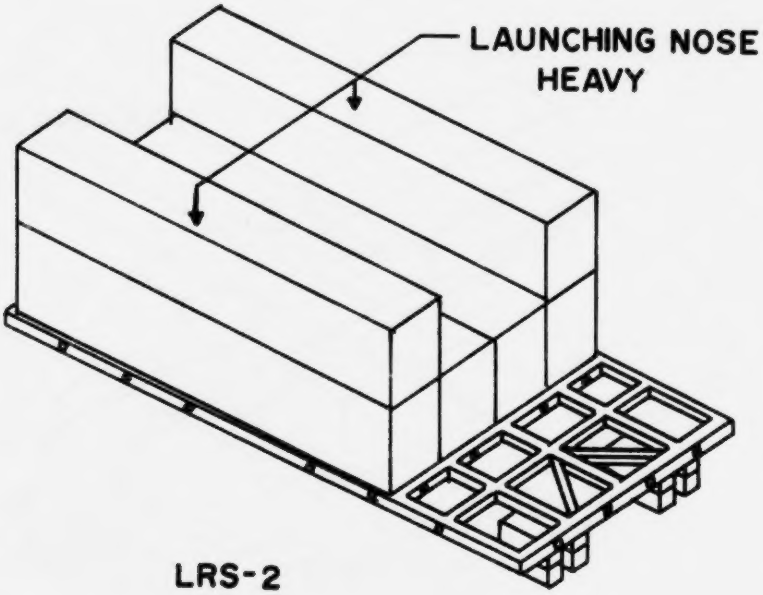
d. Place hydraulic jacks upright in outer nose section. Jacks should be placed against center vertical and tied securely to it with rope.

NOTE

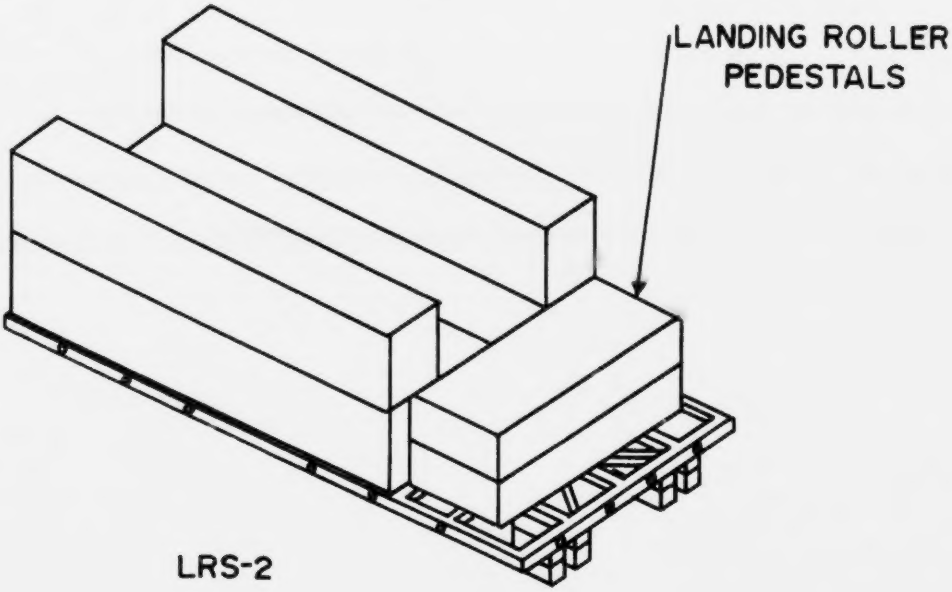
Jacks are maintained in an upright position to reduce leakage and damage to seals.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

(2) Pallet Load LRS-2 (Continued)


LAUNCHING NOSE HEAVY
LRS-2

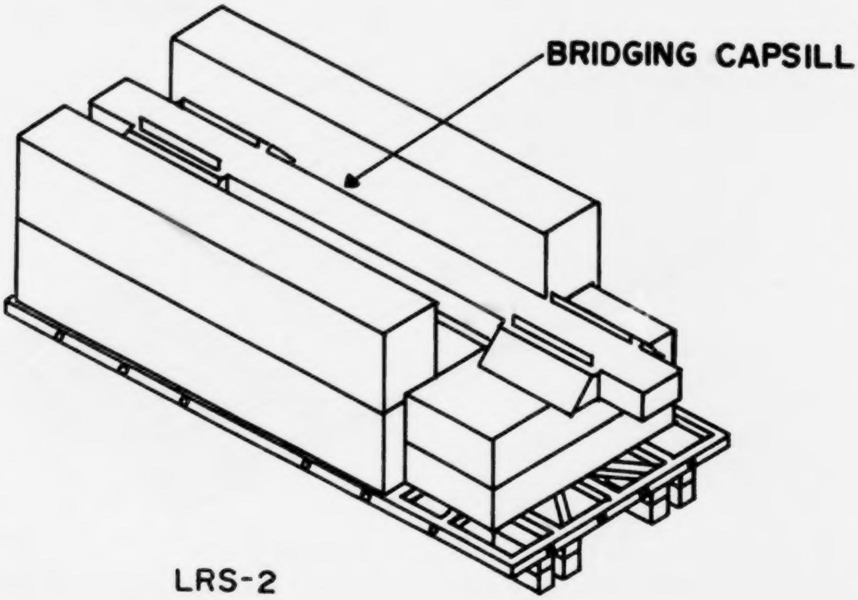
Step 2. Place 2 launching nose heavy sections on top of nose sections put on in Step 1.


LANDING ROLLER PEDESTALS
LRS-2

Step 3. Place 2 landing roller pedestals (Mk2) (one on top of the other) to the rear of the nose sections.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

(2) Pallet Load LRS-2 (Continued)



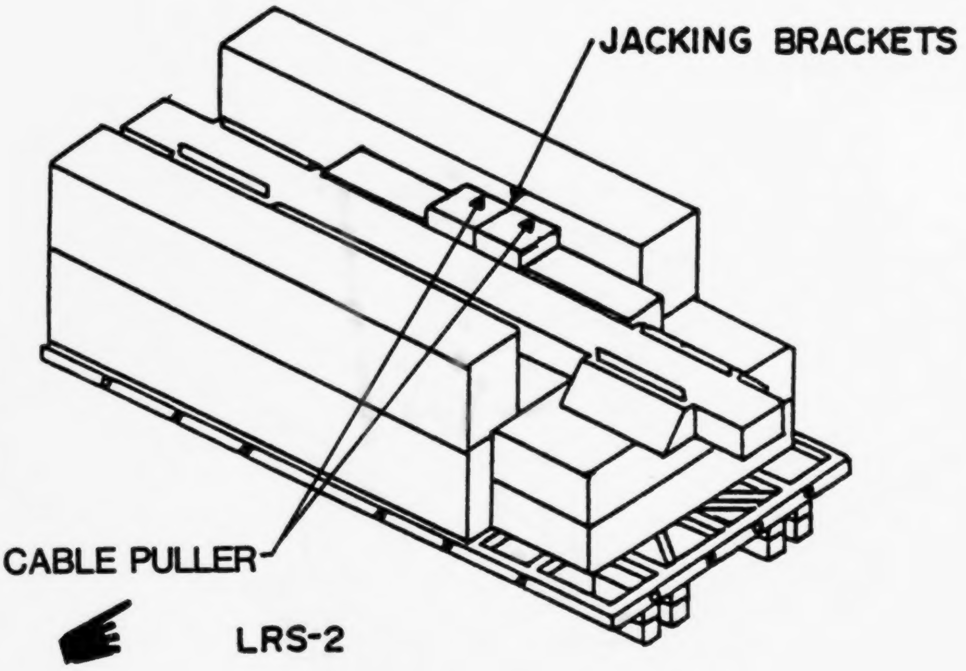
Step 4. Place bridging capsill on top of center two nose sections and pedestals.

a. Front end of capsill is flush with front end of nose sections.

b. Capsill is centered length wise between center two nose sections.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

(2) Pallet Load LRS-2 (Continued).



Step 5. Place 2 jacking brackets in recess between capsill and nose sections.

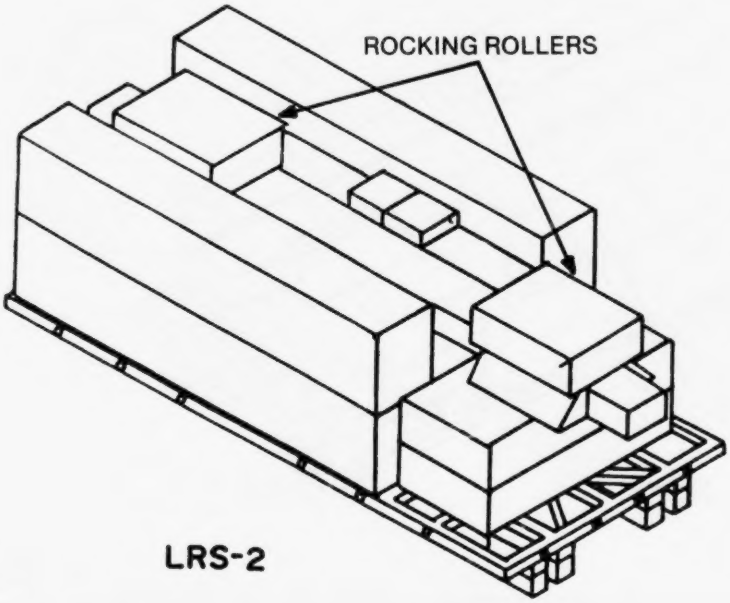
a. Pulley end of brackets face each other.

b. Brackets are placed upright in recesses (pulleys face up).

c. Place 2 cable pullers on top of jacking brackets.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

(2) Pallet Load LRS-2(Continued)



LRS-2

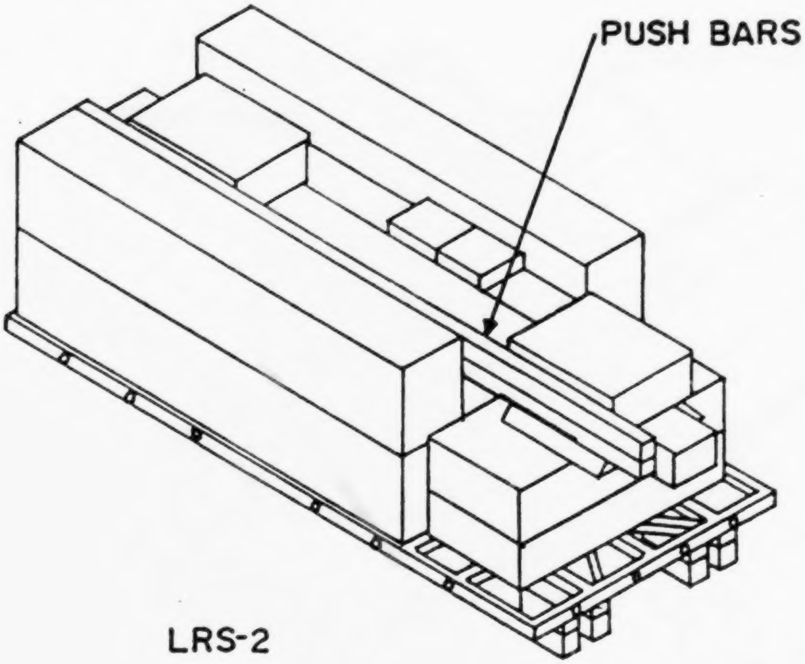
Step 6. Place 2 rocking rollers on bridging capsill.

a. Ensure that rollers are pinned to capsill with nose pins and secured with retainer clips.

b. Ensure that rollers are in the down (locked) position.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

(2) Pallet Load LRS-2 (Continued).



Step 7. Place 2 long push bars in space between nose section and capsill (to left of capsill).

a. Swivel end of push bars must be toward front of pallet.

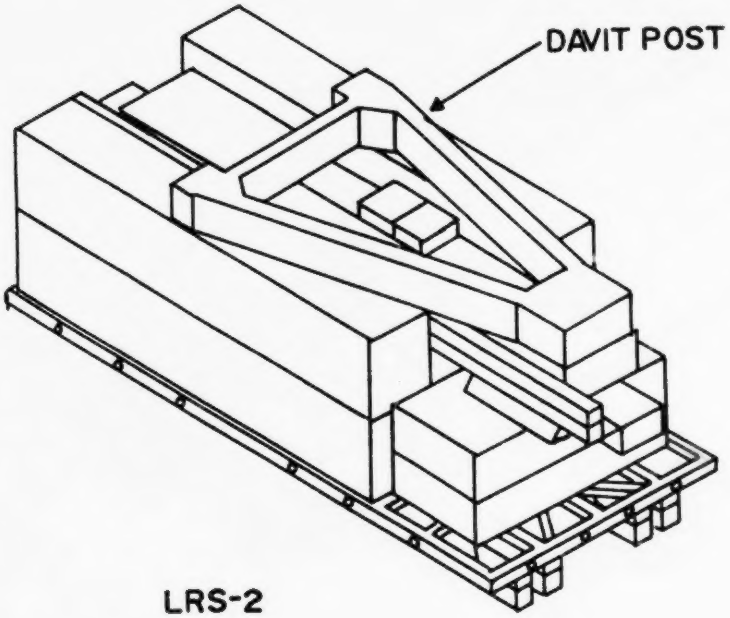
b. Push bars are positioned on their sides, one on top of the other.

c. Insert a nose pin through the swivel ends of both push bars to lock them together, secure with a retainer clip.

d. Insert a bracing pin through the fixed end of the push bars. Bracing pin will only go half way through bottom push bar. Secure with retainer clip.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

(2) Pallet Load LRS-2 (Continued)



LRS-2

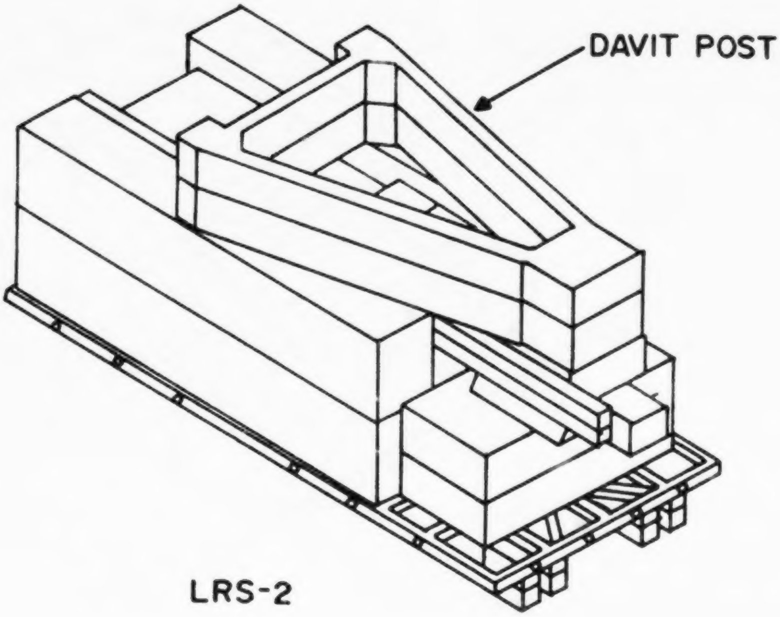
Step 8. Place 1 davit post on top of capsill and nose sections.

a. Pulleys of jacking brackets are inside of main frame of davit.

b. Packing (3 in x 9 in x 36 in) is placed between davit post (top) and rocking roller.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

(2) Pallet Load LRS-2 (Continued).



LRS-2

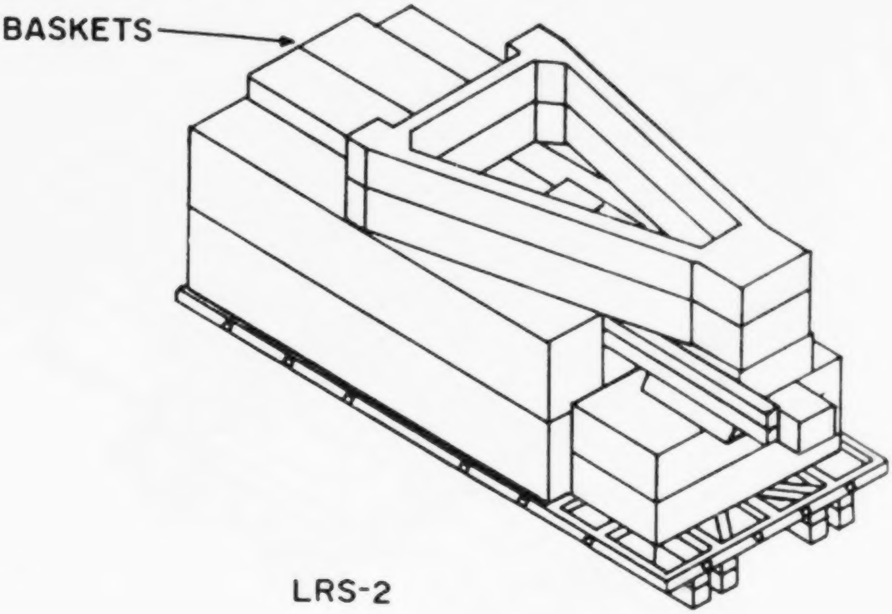
Step 9. Place 1 davit post on top of other davit post.

a. Align davit post directly over other davit post.

b. Packing (3 in x 8 in x 36 in) is placed between davits to prevent damage to pulleys.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

(2) Pallet Load LRS-2 (Continued).

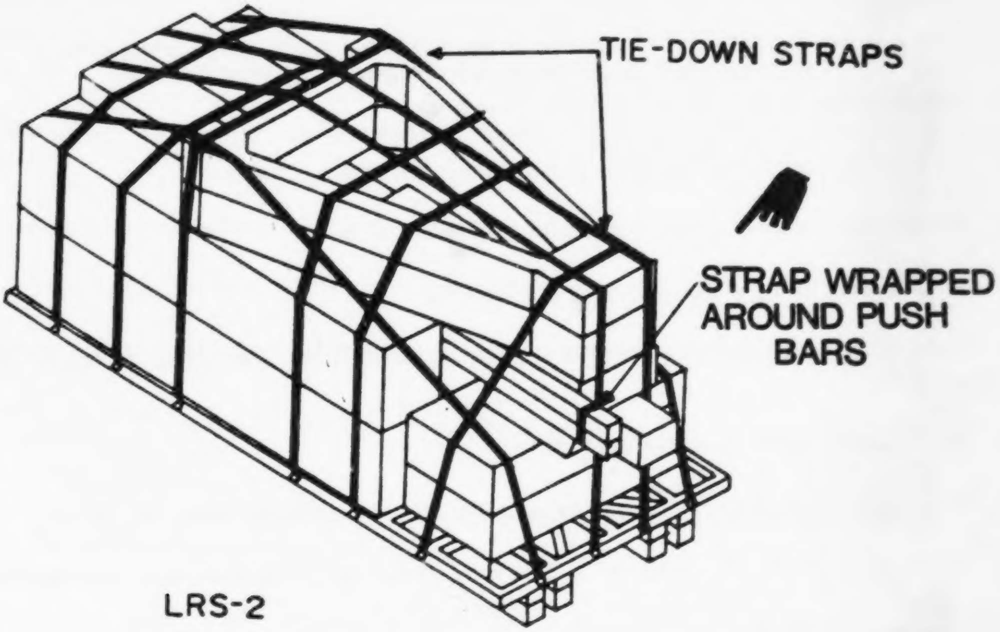


LRS-2

Step 10. Place 2 baskets (LRS-C and D) on top of load between nose sections at front of pallet.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

(2) Pallet Load LRS-2 (Continued).



Step 11. Secure load with 10 10,000 lb cargo tie-down straps.

a. Place 4 straps lengthwise over pallet load. One strap is wrapped around the ends of the push bars.

b. Ratchet assembly of strap is placed to the rear of pallet.

c. Hook straps to shackles.

d. Tighten straps.

e. Place 6 straps across pallet load.

f. Ratchet assembly of strap is placed on right side of pallet.

g. Hook straps to shackles.

h. Tighten straps.

i. Tie rubber bumper across pallet load near rear of load.

j. Roll or wrap excess strap in a neat manner.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

e. Removing Parts from Pallets. Bridge and erection parts are taken from the pallets in reverse order from the loading procedures.

f. Loading Pallet on Trailer (Load LRS-2). To load a pallet on a trailer, perform the following steps.

Step 1. Check to see that all load restraining straps are in place and properly tightened.

Step 2. Attach center ring of lifting sling to crance hook.

Step 3. Raise sling until four hook ends of sling are a few inches off ground.

Step 4. Attach four hooks of sling to four lifting rings of pallet.

Step 5. Slowly raise lifting sling until lines are taut.

Step 6. Attach one guide rope to each side of pallet at bumper end. One person is to man each of the guide ropes.

Step 7. Raise pallet until it is higher than trailer.

Step 8. Move pallet over trailer bed. Use guide ropes to center pallet over adapter.

Step 9. Move pallet so that the center of it is directly over trailer bogie (centered between wheels).

Step 10. Lower pallet slowly onto adapter.

Step 11. Lower lifting sling and disconnect it from pallet.

Step 12. Remove guide ropes from pallet.

g. Securing Pallet on Trailer. After the pallet has been placed on the trailer, it must be secured for transport. Secure the pallet to the trailer by performing the following steps:

Step 1. Place 3 restraining straps across pallet load at equal spaces. All strap ratchets should be located on the curb side at the trailer.

WARNING

Be sure all personnel are clear before throwing straps across load.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

g. Securing Pallet on Trailer (Load LRS-2) (Continued).

CAUTION

To avoid damage to strap ratchet, do not throw it across load.

Step 2. Hook straps in shackles on road side of trailer and pull straps from curb side of trailer to tighten.

Step 3. Place hook in shackles on curb side of trailer.

Step 4. Pull free and end of strap at ratchet to take up slack.

Step 5. Tighten strap by operating ratchet handle. Tighten straps at tight as possible.

CAUTION

Hand tighten only. Ratchet may be damaged if mechanical means are used to operate ratchet handle.

NOTE

Ensure that strap is fed straight into drum when tightening.

Step 6. Hook an anchor chain ratchet to large shackle on each side of trailer at rear.

Step 7. Press tension release lever on underside of ratchet assembly and turn tension adjustment until hook is extended about 3 inches (7.62 cm).

Step 8. Release chain from ratchet by pulling chain release lever down and away from ratchet.

Step 9. Put hook end of chain through pear shaped lifting ring at rear of pallet. (The extractor end of the pallet is considered the rear.)

Step 10. Hook chain back on itself.

Step 11. Pull chain tight and attach it to chain ratchet assembly.

Step 12. Lock lever which was unlocked in step 8.

Step 13. Turn tension grip adjustment until chain is tight. Hand tighten only.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

g. Securing Pallet on Trailer (Load LRS-2) (Continued).

NOTE

The hook on the ratchet assembly can be retracted without pushing the release mechanism as required in Step 7.

Step 14. Attach anchor chain ratchet to front of pallet. Use procedures outlined above except that in step 6, the chains are run under the pallet and attached to the 10,000 lb (4540.000 kg) tiedown eyes at the front of the pallet.

h. Loading Pallet on Trucks (Load LRS-1). To load pallet on truck, perform the following steps:

Step 1. Check to see that all load restaining straps are in place and properly tightened.

Step 2. Attach center ring of lifting sling to crane.

Step 3. Raise sling until the four hook ends of sling are a few inches off of ground.

Step 4. Attach four hooks of sling to four lifting rings of pallet.

Step 5. Slowly raise lifting sling until lines are taut.

Step 6. Attach one guide rope to each side of pallet at bumper end. One person is to man each of the guide ropes.

Step 7. Raise pallet until it is higher than sides of truck body.

Step 8. Move pallet over truck body.

Step 9. Use guide ropes to center pallet over truck body.

Step 10. Move pallet to front of truck body.

Step 11. Slowly lower pallet onto truck bed.

Step 12. Lower lifting sling and disconnect it from pallet.

Step 13. Remove guide ropes from pallet.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

i. Securing Pallet on Truck. After the pallet has been placed on the truck, it must be secured for transport. To secure the pallet to the truck, do the steps in this paragraph.

Step 1. Place 4 straps (5,000 lb) across pallet load at equal spaces. All straps ratchets should be located on curb side of truck.

WARNING

Be sure that all personnel are clear before throwing straps across the load.

CAUTION

If the straps are thrown across the load, the end of the strap with the ratchet should not be thrown since it may be damaged.

Step 2. Attach "J" hooks to each end of the straps.

Step 3. Tighten one strap at a time as follows:

a. Pull on strap from ratchet side of strap while "J" hook on the opposite side is being positioned so that it will hook on truck bed.

b. Pull free end of strap at ratchet to take up slack while "J" hook on ratchet side of strap is being positioned to hook on side of truck bed.

c. Tighten strap by operating ratchet handle. Tighten strap as tight as possible.

CAUTION

Hand tighten only. The ratchet may be damaged if mechanical means are used to operate the ratchet handle.

Step 4. Hook an anchor chain ratchet assembly to each pear link lifting ring at rear of pallet. (The extractor end of the pallet is considered the rear.)

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

i. Securing Pallet on Truck (Continued).

Step 5. Press tension release lever on underside of ratchet assembly and turn tension adjustment until hook is extended about 3 inches (7.62 cm).

Step 6. Release chain from ratchet assembly by pulling chain release lever down and away from ratchet.

Step 7. Hook one end of chain in tailgate chain hole in dump truck body.

Step 8. Pull chain tight and attach it to chain ratchet assembly.

Step 9. Relock chain release lever that was released in step 6.

Step 10. Turn tension grip adjustment until chain is tight. Hand tighten only.

NOTE

The hook on the ratchet assembly can be retracted without pushing the release mechanism.

j. Removing Pallets from Trailer. Dot the steps in this paragraph to remove the loaded pallet from a trailer.

Step 1. Release four anchor chains by pulling down and out on chain release levers.

Step 2. Remove chains from pallet and remove chain ratchet assemblies from trailer. Store them in a safe place to prevent damage or loss.

Step 3. Remove rubber bumper from pallet.

Step 4. Release straps which secure pallet to trailer as follows:

a. Hold ratchet handle and press down on handle center lever with thumb.

b. Lift handle until ratchet releases tension on strap.

c. Remove straps from pallet. Store straps in a safe place to prevent damage or loss.

Step 5. Attach extractor cable to pallet extractor bracket.

Step 6. Attach other end of extractor cable to an anchor point behind and in line with truck/trailer combination.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

j. Removing Pallets from Trailer (Continued).

Step 7. Move trailer forward until extractor end of pallet hits ground.

Step 8. Connect rubber bumper under high end of pallet as close to trailer as possible.

NOTE

One person on each side of the pallet should pull toward the trailer on the free ends of the bumper assembly rope.

Step 9. Move trailer forward letting pallet fall to ground.

Step 10. Disconnect extractor cable. Store it to prevent loss or damage.

Step 11. Move trailer away from bridge building area.

k. Removing pallets from truck. Do the steps in this paragraph to remove the loaded pallet from a truck.

NOTE

The pallet can be removed from the truck with an extractor cable or by dumping the extractor end of the pallet on the ground. If the pallet is dumped, omit steps 5 and 6 of the procedures. If an extractor cable is used, do all steps of the procedure.

Step 1. Release 2 anchor chains by pulling down and out on chain release levers.

Step 2. Remove chains from truck. Store chains in a safe place to prevent damage or loss.

Step 3. Remove rubber bumper from pallet.

Step 4. Release the straps which secure pallet to the truck as follows:

a. Hold ratchet handle and press down on handle center lever with thumb.

b. Lift up handle until ratchet releases tension on straps.

c. Remove straps from pallet. Store the straps in a safe place to prevent damage or loss.

Step 5. Attach extractor cable to pallet extractor bracket.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

k. Removing pallets from truck (Continued)

Step 6. Attach other end of extractor cable to an anchor point behind and in line with truck.

Step 7. Move truck forward until extractor end of pallet hits ground or raise dump body until extractor end of pallet hits ground.

Step 8. Connect rubber bumper under high end of pallet as close to truck as possible.

NOTE

One person on each side of the pallet should pull toward the truck on the free ends of the bumper assembly rope.

Step 9. Drive truck forward, letting pallet fall to ground.

Step 10. Disconnect extractor cable. Store cable to prevent loss or damage.

Step 11. Move truck away from bridge building area.

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

Table 2-15. Basket Loads

Qty Per Set	Component	LRS-A Lbs	Kgs	LRS-B Lbs	Kgs	LRS-C Lbs	Kgs	LRS-D Lbs	Kgs
2 ea	Equipment Bag (w/75 ea Clip, Retainer)					1 ea (6.5)	(2.9)	1 ea (6.5)	(2.9)
4 ea	Hammer, Plastic Face	2 ea (3)	(1.4)	2 ea (3)	(1.4)				
3 ea	Link, Launching Two Tier					2 ea (22)	(10)	1 ea (11)	(5)
22 ea	Pin, Bracing	11 ea (16.5)	(7.5)	11 ea (16.5)	(7.5)				
3 ea	Pin, Capsill							1 ea (10)	(4.5)
40 ea	Pin, Launching Nose	20 ea (120)	(54.5)	20 ea (120)	(54.5)				
4 ea	Rope, Guard	2 ea (4)	(1.8)	2 ea (4)	(1.8)				
2 ea	Seat, Bldg Frame, Jack					1 ea (6)	(2.7)	1 ea (6)	(2.7)
5 ea	Tackle, Anti-Flutter	3 ea (3)	(1.5)	2 ea (2)	(1.0)				
20 ea	Tackle, Light	5 ea (10)	(4.5)	5 ea (10)	(4.5)	5 ea (10)	(4.5)	5 ea (10)	(4.5)
2 ea	Wrench, Ratchet, 3/4 in					1 ea (5)	(2)	1 ea (5)	(2)
Total Weight of Components		(156.5)	(71.2)	(155.5)	(70.7)	(49.5)	(22.1)	(48.5)	(21.6)
Basket Weight		(62)	(28.1)	(62)	(28.1)	(62)	(28.1)	(62)	(28.1)
Total		(218.5)	(93.3)	(217.5)	(98.8)	(111.5)	(50.2)	(110.5)	(49.7)

2-16. TRANSPORT AND PALLETIZATION REQUIRED (Continued)

Table 2-16. Pallet Loads (Pounds)

Qty Per Set	Component	Pallet Load					
		LRS-1 (TRK)			LRS-2 (TRLR)		
		Qty	Lbs	Kgs	Qty	Lbs	Kgs
4 ea	Assembly, Anchor	4 ea	(1408)	(657)			
4 ea	Assembly, Post Tensioning	4 ea	(2756)	(1172)			
2 ea	Bar, Push, Long				2 ea	(250)	(108)
4 ea	Basket, Equipment	2 ea (A&B)	(716)	(327)			
4 ea	Bearer, Footwalk	4 ea	(68)	(31)			
2 ea	Bracket, Jacking				1 ea	(158)	(122)
1 ea	Capsill, Bridging				1 ea	(353)	(181)
4 ea	Footwalk	4 ea	(232)	(98)			
20 ea	Link, Reinforcing, Long	20 ea	(2400)	(1132)			
4 ea	Link, Reinforcing, Short	4 ea	(248)	(141)			
6 ea	Nose, Launching, Heavy				6 ea	(2100)	(1032)
2 ea	Pedestal, Landing Roller				2 ea	(470)	(198)
2 ea	Post, Davit				2 ea	(220)	(174)
10 ea	Post, Footwalk	10 ea	(60)	(12)			
2 ea	Roller, Rocking				2 ea	(490)	(213)
Total Weight of Components			(7888)	(3570)		(4423)	(2028)
Pallet Weight			(710)	(322)		(710)	(322)
Total			(8598)	(3892)		(5133)	(2350)

CHAPTER 3

OPERATOR/CREW MAINTENANCE INSTRUCTIONS

	Paragraph	Page
Lubrication Instructions	3-1	3-1
Maintenance Procedures	3-4	3-13
Preventive Maintenance Checks and Services (PMCS)	3-2	3-3
Troubleshooting	3-3	3-6

OVERVIEW

This section contains instructions for lubricating, PMCS, troubleshooting and maintenance that are the responsibility of the medium girder bridge operator/crew.

Section I. LUBRICATION INSTRUCTIONS

3-1. LUBRICATION

a. Keep all lubricants in closed containers and store in a clean, dry place away from external heat. Do not allow dust, dirt or other foreign material to mix with lubricants. Keep all lubrication equipment clean and ready for use.

b. Keep all external parts not requiring lubrication clean of lubricants. Before lubricating the components, wipe all points to be lubricated free of dirt and grease. Clean all lubrication points after lubricating to prevent accumulation of foreign matter.

c. Detailed lubrication Instructions.

The components of the link reinforcement set that require lubrication are listed below. Lubrication of bridge and erection set components is covered in TM5-5420-212-12.

1 Cable Puller.

There is little lubrication required except when the puller is dirty inside. To clean puller:

(a) Swill out puller with paraffin (Kerosene).

(b) Rinse with high speed jet of water (or steam).

(c) Lubricate by immersing puller in lubricating oil, MIL-L-7870A for approximately three hours.

(d) Allow puller to drain.

(e) Wipe outside dry. Puller is now ready for use or storage.

3-1. LUBRICATION (Continued)

2 Hydraulic Jack Mk2 (20 ton).

3 Stressed alloy components.
    Anchor assembly
    Jacking bracket
    Davit post
    Long reinforcing link
    Short reinforcing link
    LRP Mk2
    Post tensioning assembly
    Light tackle
    Anti-flutter tackle

These components require little if any lubrication, but they must be kept clean in order for moving parts to work freely.

The biggest part of this cleaning can be done with compressed air.

WARNING

- **When using compressed air, wear safety goggles or glasses and ensure air blast is not directed toward another person.**
- **Use compressed air to remove dust, dirt and other foreign matter from rollers, pulleys and pin holes.**

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-2. OPERATOR/CREW PMCS

a. General. To ensure that the Link Reinforcement Set is ready for operation at all times, it must be inspected systematically so that the defects may be discovered and corrected before they result in serious damage failure.

(1) Defects discovered during operation of the unit shall be noted for future corrections, to be made as soon as an operation has ceased. Stop operation that would damage equipment if operation were to continue.

(2) All deficiencies and shortcomings shall be reported together with corrective action taken on DA Form 2404, Equipment Inspection and Maintenance Worksheet, at the earliest opportunity.

(3) When performing before operation (B) and during operation (D) PMCS, always keep in mind CAUTIONS and WARNINGS.

(4) After operation, be sure to perform (A) PMCS.

(5) If equipment fails to operate, troubleshoot with proper equipment. Report deficiencies using the proper forms, see DA Pamphlet 738-750.

b. Preventive Maintenance Checks and Services. Refer to Table 3-1 for Preventive Maintenance Checks and Services.

(1) Item Number Column. Checks and Services are numbered in chronological order regardless of interval. This column will be used as a source of item numbers for the TM item number column on DA Form 2404 in recording results of PMCS.

(2) Interval Columns. Columns headed B,D,A,W, and M will contain a dot (.) oppósite appropriate check indicating it is to be performed before, during, after, weekly, or monthly.

(3) Items to be Inspected Column. Items listed in this column are divided into groups and indentifies items to be inspected.

(4) Procedures Column. This column contains a brief description of the procedure by which the check is to be performed.

(5) For Readiness Reporting, Equipment is Not Ready/Available If Column. This column contains criteria which causes the equipment to be classified as not ready/available because of inability to perform its primary mission.

NOTE

- **If you are operating the equipment for the first time, perform W checks as well as B checks.**
- **If equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation.**

3-2. OPERATOR/CREW PMCS (Continued)

Table 3-1. Operator/Crew Preventive Maintenance Checks and Services

NOTE: Within designated interval, these checks are to be performed in the order listed.

B - Before
D - During
A - After
W - Weekly
M - Monthly

Item No.	Interval					Items to be Inspected	Procedures Check for and have repaired or adjusted as necessary	For Readiness Reporting, Equipment Is Not Ready Available If:
	B	D	A	W	M			
1		●				Link Reinforcement Set	Evidence of damage and security of installation	
2		●				Anchor Assembly	Cracked, broken or bent pin jaws or forks	Cracks or breaks in pin jaws or forks
2		●				Post Tensioning Assembly:		
						Frame	Cracked, broken or bent upper jaws, brackets or connectors; tensioning check marks stenciled on frame	Cracks or breaks in upper jaws
						Post	Cracked, broken or bent pin jaws; tensioning check mark stenciled on sliding block	Cracks or breaks in pin jaws
						Cable Puller Cable and Tackle Block	Cracked, broken or bent connectors, operating handles and spigots; frays, cuts or flattened or smooth areas in cable	Cracks or breaks in connectors; frays, cuts, flattened or smooth areas in cable longer than 6 inches (15.0 cm)
4		●				Reinforcing Links (long and and short)	Cracked, broken or bent pin jaws	Cracks or breaks in pin jaws
5		●				Light and Anti-flutter Tackle	Frays or cuts in rope; cracked, broken or bent toggle bar, plates or hooks	Cuts in rope; crack or breaks in toggle bar, plates or hooks
6		●				Footwalk, Bearer Post and Guard Rope	Cracked, broken or bent connectors or brackets. Frays or cuts in rope	Cracks or breaks in connectors or brackets frays or cuts in rope

Table 3-1. Operator/Crew Preventive Maintenance Checks and Services

NOTE: Within designated interval, these checks are to be performed in the order listed.

B - Before **A - After** **M - Monthly**
D - During **W - Weekly**

Item No.	Interval					Items to be Inspected	Procedures Check for and have repaired or adjusted as necessary	For Readiness Reporting, Equipment Is Not Ready Available If:
	B	D	A	W	M			
7		●				Davit Post	Cracked, broken or bent safety chains, lugs, levelling screws or pulleys; "outside" stenciled on base of davit post	Cracks or breaks in safety chains, lugs, levelling screws, or pulleys
8		●				Jacking Bracket	Cracked, broken or bent link, lugs or pulley	Cracks or breaks in link, lugs or pulley
9		●				Landing Roller Pedestal Mk2	Cracked, broken or bent jack hood, or frame members	Cracks or breaks in jack hood
10		●				Rocking Roller	Cracked, broken or binding rollers	
11		●				Launching Nose Links	Cracked, broken or bent surfaces	Cracks or breaks in link
12		●				Bridging Capsill	Cracked, broken or bent connectors, and jack hood	
13		●				Push Bar	Cracked or broken; "Other side up" stenciled on bottom of push bar	Cracks or breaks in push bar
14		●				Hydraulic Jack	Cracked, broken or leaking housing; missing head	Will not lift, or leaks badly.
15		●				Pallets and Adapter	Cracked, broken or missing hardware	
16		●				Hammer	Cracked or broken handle or nylon face	
17		●				Ratchet Wrench	Binding operation	

Section III. TROUBLESHOOTING PROCEDURES

3-3. OPERATOR'S TROUBLESHOOTING PROCEDURES

General.

a. This section contains troubleshooting information for locating and correcting most of the operating troubles which may develop in the Link Reinforcement Set. Table 3-2 contains Malfunctions, Test/Inspections, and Corrective Action within the scope of Operator/Crew Repair as authorized by the maintenance allocation chart, Appendix C. The malfunctions are followed by a list of tests or inspections which will help determine probable causes and corrective actions to take. The Tests/Inspections and Corrective Actions are performed in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or corrected by listed corrective actions, refer the malfunctions to organizational maintenance personnel.

SYMPTOM INDEX

	TROUBLESHOOTING PROCEDURE	
	MALFUNCTION ITEM NO.	PAGE
ANCHOR ASSEMBLY		
Fork End Anchor Operation	1. and 3.	3-7 3-8
Anchor Junction Block	2.	3-8
POST TENSIONING ASSEMBLY		
Upper Jaws	4.	3-8
Retainer Clips	5.	3-9
Pulley	6.	3-9
Sliding Block	7.	3-9
Link Connecting Block	8.	3-10
REINFORCING LINKS	9.	3-10
LIGHT TACKLE	10.	3-10
TOGGLE BARS	11.	3-11

3-3. OPERATOR'S TROUBLESHOOTING PROCEDURES (Continued)

SYMPTOM INDEX (Continued)

	TROUBLESHOOTING PROCEDURE	
	MALFUNCTION ITEM NO.	PAGE
FOOTWALK ASSEMBLY		
Bearer	12. and 13.	3-11
Footwalk	13	3-11
DAVIT POST ASSEMBLY		
Levelling Screw	14.	3-11
Pulley	15.	3-11
Push Bar Lugs	16.	3-12
JACKING BRACKET		
Pulley	17.	3-12
Safety Chain Lugs	18.	3-12
ROCKING ROLLERS	19.	3-12
HYDRAULIC JACK	20.	3-13

Table 3-2. Operator/Crew Troubleshooting.

MALFUNCTION
  TESTING OR INSPECTION
    CORRECTIVE ACTION

1. Fork end anchors will not swing from one position to another. Inspect for:

Step 1. Burrs on edges of fork or end of link plate.

Use file to remove burrs.

Step 2. Bent forks.

Replace anchor assembly. Report condition to Organizational Maintenance.

3-3. OPERATOR'S TROUBLESHOOTING PROCEDURES (Continued)

Table 3-2. Operator/Crew Troubleshooting (Continued)

MALFUNCTION
TESTING OR INSPECTION
CORRECTIVE ACTION

---

2. Long link will not connect to anchor junction block of anchor assembly (Continued).

Step 2. Burrs on pin jaws of block, link or nose pins.

Use file to remove burrs.

Step 3. Pin jaws bent on block.

Replace anchor assembly. Report condition to Organizational Maintenance.

3. Bracing pins will not go through pin holes in fork end anchors or link plate. Inspect for:

Step 1. Obstruction (dirt, rocks) in pin holes.

Clean pin holes.

Step 2. Burrs on edges of pin holes or bracing pin.

Use file to remove burrs.

Step 3. Bent fork.

Replace anchor assembly. Report condition to Organizational Maintenance.

4. Post tensioning upper jaws will not lock in place. Inspect for:

Step 1. Obstruction (dirt, rocks) in moving part of upper jaws.

Clean upper jaws.

Step 2. Burrs on edges of upper jaws.

Use file to remove burrs.

Step 3. Upper jaws bent.

Replace post tensioning assembly. Report condition to Organizational Maintenance.

3-3. OPERATOR'S TROUBLESHOOTING PROCEDURES (Continued)

Table 3-2. Operator/Crew Troubleshooting (Continued)

MALFUNCTION
TESTING OR INSPECTION
CORRECTIVE ACTION

---

5. Retainer clips will not go through pin hole in upper jaws. Inspect for:

Step 1. Obstruction (dirt, rocks) in pin holes.

Clean pin holes.

Step 2. Burrs on edges of pin holes.

Use file to remove burrs.

Step 3. Bent upper jaws.

Replace post tensioning assembly. Report condition to Organizational Maintenance.

6. Pulley binds or will not turn in post tensioning assembly. Inspect for:

Step 1. Dirt and grease on shaft or in pulley shaft hole.

Clean shaft and hole.

Step 2. Bent pulley shaft.

Replace post tensioning assembly. Report condition to Organizational Maintenance.

7. Sliding block binds or will not slide in post tensioning assembly. Inspect for:

Step 1. Dirt and grease on sliding block and frame.

Clean frame and block.

Step 2. Bent flanges in frame.

Replace post tensioning assembly. Report condition to Organizational Maintenance.

3-3. OPERATOR'S TROUBLESHOOTING PROCEDURES (Continued)

Table 3-2. Operator/Crew Troubleshooting (Continued)

MALFUNCTION
TESTING OR INSPECTION
CORRECTIVE ACTION

---

8. Reinforcing links will not connect to link connecting block of post tensioning assembly. Inspect for:

Step 1. Obstruction (dirt, rocks) in pin jaws.

Clean pin jaws.

Step 2. Burrs on pin jaws of block, link, or nose pin.

Use file to remove burrs.

Step 3. Pin jaws bent on block.

Replace post tensioning assembly. Report condition to Organizational Maintenance.

9. Reinforcing links will not connect to another link, link connecting block, or anchor junction block. Inspect for:

Step 1. Obstruction (dirt, rocks) in pin jaws.

Clean pin jaws.

Step 2. Burrs on pin jaws of links, block or nose pin.

Use file to remove burrs.

Step 3. Pin jaws bent on link.

Replace link. Report condition to Organizational Maintenance.

10. Light tackle pulley will not turn. Inspect for:

Step 1. Dirt and grease build up on shaft or in pulley shaft hole.

Clean shaft and hole.

Step2. Bent pulley or shaft.

Replace light tackle. Report condition to Organizational Maintenance.

3-3. OPERATOR'S TROUBLESHOOTING PROCEDURES (Continued)

Table 3-2. Operator/Crew Troubleshooting (Continued)

MALFUNCTION
    TESTING OR INSPECTION
        CORRECTIVE ACTION

---

11. Toggle bars do not turn freely in block. Inspect for:

    Step 1. Dirt and grease build up on shaft or in toggle bar hole in block.

    Clean shaft and hole.

    Step 2. Bent toggle bar shaft.

    Replace tackle. Report conditions to Organizational Maintenance.

12. Footwalk bearer will not attach to post tensioning assembly. Inspect for:

    Step 1. Bent attaching bracket.

    Replace bearer. Report condition to Organizational Maintenance.

13. Footwalk will not seat correctly on bearers. Inspect for:

    Step 1. Bent connecting lugs on bearers.

    Replace bearer. Report condition to Organizational Maintenance.

    Step 2. Warped footwalk.

    Replace footwalk. Report condition to Organizational Maintenance.

14. Davit post levelling screws will not operate smoothly or completely. Inspect for:

    Step 1. Dirt and grease build up on threads.

    Clean threads.

15. Davit post pulleys will not turn. Inspect for:

    Step 1. Dirt and grease build up on shaft or in pulley shaft hole.

    Clean shaft and hole.

    Step 2. Bent pulley or shaft.

    Replace davit post. Report condition to Organizational Maintenance.

3-3. OPERATOR'S TROUBLESHOOTING PROCEDURES (Continued)

Table 3-2. Operator/Crew Troubleshooting (Continued)

MALFUNCTION
    TESTING OR INSPECTION
        CORRECTIVE ACTION

---

16. Push bar will not connect to davit post push bar lugs. Inspect for:

Step 1. Burrs on edges of lugs or end of push bar. Burrs on bracing pin.

Use file to remove burrs.

Step 2. Bent push bar lugs on davit post.

Replace davit post. Report condition to Organizational Maintenance.

17. Jacking bracket pulleys will not turn. Inspect for:

Step 1. Dirt and grease build up on shaft or in pulley shaft hole.

Clean shaft and hole.

Step 2. Bent pulley or shaft.

Replace jacking bracket. Report condition to Organizational Maintenance.

18. Pin will not go through pin hole in safety chain lugs. Inspect for:

Step 1. Dirt in pin holes.

Clean pin holes.

Step 2. Bent safety chain lugs.

Replace jacking bracket. Report condition to Organizational Maintenance.

19. Rollers in rocking roller bind or will not turn. Inspect for:

Step 1. Dirt and grease built up in rollers.

Replace rocking roller. Report condition to Organizational Maintenance.

3-3. OPERATOR'S TROUBLESHOOTING PROCEDURES (Continued)

Table 3-2. *Operator/Crew Troubleshooting (Continued)*

MALFUNCTION
    TESTING OR INSPECTION
        CORRECTIVE ACTION

---

20. Hydraulic jack does not lift or will not hold position when operated. Inspect for:

Step 1. Release valve screw closed tightly.

Tighten screw.

Step 2. Check fluid level for correct amount of hydraulic oil.

Add hydraulic oil to level. Use only MIL-L-7870A.

3-4. MAINTENANCE PROCEDURES.

a. General. The operator/crew is responsible for preventive maintenance checks and services, as designated in Table 5-20, inspection and repair by replacement of link reinforcement set parts and for inspection and service of pallets as allocated by the maintenance allocation chart, Appendix C.

b. Link reinforcement set components. The extent of maintenance that can be performed at operator/crew level is restricted to replacement and/or servicing of component sub-assemblies below.

TASK	PROCEDURES	PAGE
1	Levelling screw (davit post)	3-14
2	Hydraulic jack (20-ton)	3-15

3-4. MAINTENANCE PROCEDURES (Continued)

(1) LEVELLING SCREW (DAVIT POST)

This task covers:

a. Removal b. Service/Repair c. Installation

INITIAL SETUP

Materials/Parts	Condition Description
Clean Cloths Lubricating Oil (MIL-L-7870A) Grease, Auto and Art. (GAA)	Levelling screw in davit post

Tools

None

Personnel Required

MOS 12C Bridge Crewman/Specialist

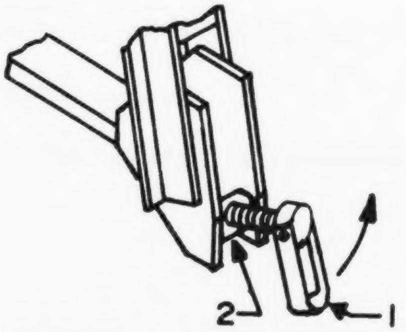
LOCATION /ITEM	ACTION	REMARKS

NOTE

If levelling screw has been bent, do not try to remove it. Refer bent screw to Organizational Maintenance.

REMOVAL

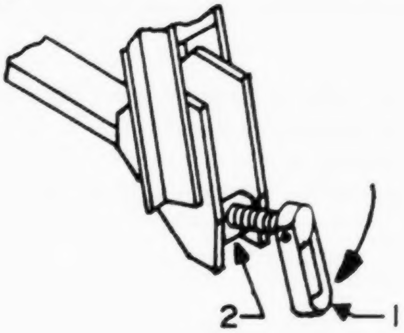
LOCATION /ITEM	ACTION	REMARKS
1. Levelling screw	a. Unscrew levelling screw (1) and remove from swivel mount (2). b. Do not remove swivel mount (2) from davit post.	



3-4. MAINTENANCE PROCEDURES (Continued)

(1) LEVELLING SCREW (DAVIT POST) (Continued)

LOCATION /ITEM	ACTION	REMARKS
SERVICE/REPAIR		
1. Levelling screw	a. Clean with oil soaked cloth.	
	b. Wipe dry with a clean dry cloth.	
	c. Apply a light coat of GAA to threaded part of screw.	
INSTALLATION		
1. Levelling screw	a. Install levelling screw (1) in swivel mount (2).	



(2) HYDRAULIC JACK (20 TON)

This task covers:

a. Service

INITIAL SETUP

Materials/Parts	Condition Description
Clean Cloths Lubricating Oil (MIL-L-7870A)	Jack sitting on level surface.

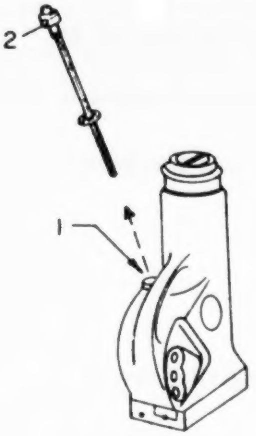
Tools

None

Personnel Required

62B Construction Equipment Repairman

3-4. MAINTENANCE PROCEDURES (Continued)

LOCATION /ITEM	ACTION	REMARKS
SERVICE		
1. Filler cap	a. Remove filler cap (1) and inspect seal (2) on washer.	
	b. Fill to level indicated on dipstick with fresh clean lubricating oil, MIL-L-7870A.	
	c. Install filler cap, hand tighten only.	

(2) HYDRAULIC JACK (20 TON) (Continued)

LOCATION /ITEM	ACTION	REMARKS
SERVICE (Continued)		
	d. Operate pump until ram has risen two or three inches.	
	e. Unscrew release valve screw no more than 1 1/2 turns.	
	f. Press ram down as far as it will go.	
	g. Repeat d, e, and f five times to complete removal of air in system.	

c. Painting.

(1) After an item has had zinc coating removed or protective coating damaged, add the following finishes for the prevention of corrosion with minimum delay.

(2) Painting should be accomplished in accordance with MIL-B-704, type B. This includes a pretreatment primer, intermediate and a finish coat.

NOTE

For good joint adhesion, the area must be clean and dry.

WARNING

When applying a pretreatment primer, operator must wear eye protection.

(3) A pretreatment primer conforming to MIL-P-15328, NSN 8030-00-350-7076 is applied to a metal surface to improve the adhesion of the primer paint.

(4) The pretreatment consists of an acid component. After mixing the solution it should be used within 8 hours. Therefore only mix the amount required for the pretreatment application.

(5) This treatment combines with the surface of the metal to form a thin protective coating. About 15 minutes after application this primer dries to a thin clear coating. This primer makes it possible for the additional coats to bond and adhere properly. The primer coat should be applied over the pretreatment within four hours.

d. Primer and Intermediate Coat. Thes consist of one coat each of paint conforming to MIL-P-12742 NSN 8010-00-298-2284. In order to obtain the maximum protection the first coat should be applied by brush paying particular attention to bolt heads, corners, crevices and welds. The paint should be applied as evenly as possible to ensure that all the surfaces are painted. Particular attention should be observed to drying time indicated for the paint. Do not rush coats. Allow sufficient drying time between coats.

e. Finish Coat. Apply a finish coat over the primer and intermediate coat with enamel, alkyd, camouflage, Flash Dry Forrest Green conforming with MIL-E-52929.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

	Paragraph	Page
Service Upon Receipt	4-2	4-1
Repair Parts, Special Tools and Equipment	4-3	4-2
Preventive Maintenance Checks and Services (PMCS)	4-4	4-3
Troubleshooting	4-5	4-10
Maintenance Procedures	4-6	4-12

OVERVIEW

This chapter contains maintenance and servicing procedures that are the responsibility of organizational maintenance. Operator/crew maintenance tasks given in Chapter 3 are not repeated in this section.

Section I. SERVICE UPON RECEIPT

4-1. GENERAL

a. Upon receipt of the link reinforcement set (LRS), check all items for any damage that may have occured during shipping. Ensure that all parts are received in a serviceable condition. Any defective material will be turned into Direct Support Maintenance.

b. Inspection of all components will be performed using the inspection check list below. Before unpacking, be sure that the containers are right side up. Unpack and inventory components according to the components listed in supply catalog SC 5420-97-CL-E56.

4-2. SERVICE UPON RECEIPT CHECK LIST

Item to be Inspected Procedure	Work Time M/Hrs
Reinforcement Components	
Anchor Assembly Post Tensioning Assembly Long and Short Reinforcement Links Cable Puller	
Inspect components for cracks, breaks, dents, peeling paint, cracked or broken connectors, brackets and pin jaws, damaged or missing pins, and missing hardware.	

4-2. SERVICE UPON RECEIPT CHECK LIST (Continued)

Item to be Inspected Procedure	Work Time M/Hrs

Launch and Erection Components in LRS

Landing Roller Pedestal
Davit Post
Jacking Bracket
Launching Nose Heavy Units
Bridging Capsill
Rocking Roller
Push Bar
Cable Puller

Inspect components for cracks, breaks, dents, peeling paint, cracked or broken connectors, brackets and pin jaws, damaged or missing pins and hardware. Ensure stenciled warnings and/or markings are in place and legible.

Other Components in LRS

Light and Anti-flutter Tackle
Guard Rope
Footwalk Assembly
Pins (bracing, nose, and anchorage)
Baskets
Pallets and Adapter

Inspect components for cracks, breaks, dents, peeling paint, cracked or broken connectors, brackets and pin jaws, damaged or missing pins and hardware. Check for frayed or damaged rope, missing hooks and toggle bars.

Section II. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT

4-3. COMMON TOOLS AND EQUIPMENT

a. Common tools and equipment. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

b. Special tools and support equipment. There are no special tools required for organizational maintenance to maintain the link reinforcement set.

c. Set listing. See 5C5420-97-CL-E56 for components required for the Link Reinforcement Set.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

4-4. INTRODUCTION

a. This section contains organizational PMCS for the Link Reinforcement Set. Table 4-1 lists and describes the necessary checks and services to be performed in conjunction with the checks and services provided in paragraph 3-3.

b. Item numbers are listed consecutively and indicate the sequence of minimum requirements.

Table 4-1. Organizational Preventive Maintenance Checks and Services.

Q - Quarterly
S - Semiannually
A - Annually

Item No.	Interval			Items to be Inspect	Procedures	For Readiness Reporting, Equipment Is Not Ready Available If:
	Q	S	A			
1		●		Link Reinforcement Set	Inspect installed link set for evidence of damage and security of installation	
2		●		Anchor Assembly	Cracked, broken or bent pin jaws or forks	Cracks or breaks in pin jaws or forks.
3		●		Post Tensioning Assembly:		
				Frame	Cracked, broken or bent upper jaws, brackets or Connectors; tensioning check mark stenciled on sliding block.	Cracks or breaks in upper jaws.
				Post	Cracked, broken or bent pin jaws. Tensioning check mark stenciled on sliding block.	Cracks or breaks in pin jaws.
				Cable Puller, Cable and Tackle Block	Cracked, broken or bent connectors, operating handles and spigots. Frayed, cut, flattened or smooth areas in cable.	Cracks or breaks in connectors. Frays, cuts, flattened or smooth areas in cable longer than 6 inches (15.0 cm).

Table 4-1. Organizational Preventive Maintenance Checks and Services (Continued)

Q - Quarterly
S - Semiannually
A - Annually

Item No.	Interval			Items to be Inspected	Procedures	For Readiness Reporting, Equipment Is Not Ready Available If:
	Q	S	A			
4		●		Reinforcing Links (long and short)	Cracked, broken or bent pin jaws	Cracks or breaks in pin jaws
5		●		Light and Anti-flutter Tackle	Frayed or cuts in rope; cracked, broken or bent toggle bar, plates or hooks	Cuts in rope. Cracks or breaks in toggle bar, plates or hooks
6		●		Footwalk Bearer, Post and Guard Rope	Cracked, broken or bent connectors or brackets; frayed or cuts in rope	Cracks or breaks in connectors or brackets; frays or cuts in rope
7		●		Davit Post	Cracked, broken or bent safety chains, lugs levelling screws or pulleys. "Outside" stenciled on base of davit post.	Cracks or breaks in safety chains, lugs, levelling screws or pulleys
8		●		Jacking Bracket	Cracked, broken or bent link, lugs or pulley	Cracks or breaks in jack hood
9		●		Landing Roller Pedestal Mk2	Cracked, broken or bent jack hood, or frame members	Cracks or breaks in jack hood
10		●		Rocking Roller	Cracked, broken or binding rollers	
11		●		Launching Nose Links	Cracked, broken or bent	Cracks or breaks in links

Table 4-1. Organizational Preventive Maintenance Checks and Services (Continued)

Q - Quarterly
S - Semiannually
A - Annually

Item No.	Interval			Items to be Inspected	Procedures	For Readiness Reporting, Equipment Is Not Ready Available If:
	Q	S	A			
12		●		Bridging Capsill	Cracked, broken or bent connectors, jack hoods	Cracks or breaks in connectors or jack hoods
13		●		Push Bar	Cracked or broken; "Other Side Up" stenciled on bottom of push bar	Cracks or breaks in push bar
14		●		Hydraulic Jack	Cracked, broken or leaking housing; missing head	Will not lift or leaks badly
15		●		Pallets and adapter	Cracked, broken or missing hardware	
16		●		Hammer	Cracked or broken handle or nylon face	
17		●		Ratchet Wrench	Binding operation	

Section IV. TROUBLESHOOTING PROCEDURES

4-5. ORGANIZATIONAL MAINTENANCE TROUBLESHOOTING

a. General Troubleshooting.

(1) Information in this section is for use by organizational maintenance personnel, in conjunction with, and as a supplement to the troubleshooting information in Table 3-2. It provides continuation of instructions where a rememdy in the operator/crew troubleshooting table refers to organizational maintenance personnel for corrective action.

(2) The troubleshooting procedure, where applicable, will be performed with components installed.

4-5. ORGANIZATIONAL MAINTENANCE TROUBLESHOOTING (Continued)

(3) Inspections made while components are mounted on equipment are, for the most part, visual. The appearance of a component or assembly may indicate its general condition.

(4) Ensure that all components are properly installed. Examine for loose or missing attaching hardware; secure or replace as required. Inspect for dented or cracked surfaces, bent or broken lines or parts, fungus growth, moisture corrosion, dirt or other foreign matter, oil leakage, evidence of tampering or other evidence of misuse that might indicate the source of trouble.

b. Troubleshooting.

(1) Upon completion of general troubleshooting, perform specific troubleshooting procedures listed in table 4-1.

(2) Table 4-2 contains malfunctions (or defects), tests/inspections, and corrective actions within the scope of organizational repair as authorized by the Maintenance Allocation Chart, Appendix C. The malfunctions (or defects) are followed by a list of tests or inspections which will help to determine probable causes and corrective actions to take. The tests/inspections and corrective actions should be performed in the order listed. (See symptom index.)

SYMPTOM INDEX

	TROUBLESHOOTING PROCEDURE	
	MALFUNCTION ITEM	PAGE
ANCHOR ASSEMBLY		
Fork End Anchor Operation	1. and 3.	4-7
Anchor Junction Block	2.	4-8
POST TENSIONING ASSEMBLY		
Upper Jaws	4. and 5.	4-8
Pulley	6.	4-9
Sliding Block	7.	4-9
Link Connecting Block	8.	4-9
REINFORCING LINKS	9.	4-9
LIGHT TACKLE	10. and 11.	4-10
ANTI-FLUTTER TACKLE	11.	4-10

4-5. ORGANIZATIONAL MAINTENANCE TROUBLESHOOTING (Continued)

SYMPTOM INDEX

	TROUBLESHOOTING PROCEDURE	
	MALFUNCTION ITEM NO.	PAGE
FOOTWALK ASSEMBLY		
Bearer	12. and 13.	4-10
Footwalk	13.	4-10
DAVIT POST ASSEMBLY		
Levelling Screw	14.	4-10
Pulley	15.	4-10
Push Bar Lugs	16.	4-11
JACKING BRACKET		
Pulley	17.	4-11
Safety Chain Lugs	18.	4-11
ROCKING ROLLERS	19.	4-11
HYDRAULIC JACK	20.	4-11

Table 4-2. Organizational Troubleshooting.

MALFUNCTION
TESTING OR INSPECTION
CORRECTIVE ACTION

1. Fork end anchors will not swing from one position to another. Inspect for:

Step 1. Bent fork.

Report condition to Direct Support Maintenance.

Step 2. Damaged or distorted hinge pin or pin hole.

Report condition to Direct Support Maintenance.

4-5. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES (Continued)

Table 4-2. Organizational Troubleshooting.

MALFUNCTION
    TESTING OR INSPECTION
        CORRECTIVE ACTION

---

2. Long link will not connect to anchor junction block of anchor assembly. Inspect for:

Step 1. Pin jaws bent on block.

Report condition to Direct Support Maintenance.

Step 2. Damaged or distorted assembly bolts.

Report condition to Direct Support Maintenance

3. Bracing pins will not go through pin holes in fork end anchors or link plate. Inspect for:

Step 1. Bent fork.

Report condition to Direct Support Maintenance.

Step 2. Bent link plate.

Report condition to Direct Support Maintenance.

4. Post tensioning upper jaws will not lock in place. Inspect for:

Step 1. Bent upper jaws.

Report condition to Direct Support Maintenance.

Step 2. Bent upper jaw base.

Report condition to Direct Support Maintenance.

5. Retainer clips will not go through holes in upper jaws. Inspect for:

Step 1. Bent upper jaws.

Report condition to Direct Support Maintenance.

Step 2. Bent upper jaw base.

Report condition to Direct Support Maintenance.

4-5. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES (Continued)

Table 4-2. Organizational Troubleshooting (Continued)

MALFUNCTION
    TESTING OR INSPECTION
        CORRECTIVE ACTION

---

6. Pulley binds or will not turn in post tensioning assembly. Inspect for:

Step 1. Bent pulley shaft.

Report condition to Direct Support Maintenance.

Step 2. Damaged or distorted shaft hole in frame.

Report condition to Direct Support Maintenance.

7. Sliding block binds or will not slide in post tensioning assembly. Inspect for:

Step 1. Bent flanges in frame.

Report condition to Direct Support Maintenance.

Step 2. Bent or distorted edges on sliding block.

Report condition to Direct Support Maintenance.

8. Reinforcing links will not connect to link connecting block of post tensioning assembly. Inspect for:

Step 1. Bent pin jaws on block.

Report condition to Direct Support Maintenance.

Step 2. Damaged or distorted assembly bolts.

Report condition to Direct Support Maintenance.

9. Reinforcing links will not connect to another link, link connecting block, or anchor junction block. Inspect for:

Step 1. Bent pin jaws on link.

Report condition to Direct Support Maintenance.

4-5. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES (Continued)

Table 4-2. Organizational Troubleshooting (Continued)

MALFUNCTION
TESTING OR INSPECTION
CORRECTIVE ACTION

10. Light tackle pulley will not turn. Inspect for:

Step 1. Bent pulley or shaft.

Report condition to Direct Support Maintenance.

11. Toggle bars do not turn freely in block. Inspect for:

Step 1. Bent toggle bar shaft.

Report condition to Direct Support Maintenance.

12. Footwalk bearer will not attach to post tensioning assembly. Inspect for:

Step 1. Bent attaching bracket.

Report condition to Direct Support Maintenance.

13. Footwalk will not seat correctly on bearers. Inspect for:

Step 1. Bent connecting lugs on bearers.

Report condition to Direct Support Maintenance.

Step 2. Warped footwalk.

Report condition to Direct Support Maintenance.

14. Davit post levelling screws will not operate smoothly or completely. Inspect for:

Step 1. Bent levelling screw.

Report condition to Direct Support Maintenance.

15. Davit post pulleys will not turn. Inspect for:

Step 1. Bent pulley or shaft.

Report condition to Direct Support Maintenance.

4-5. ORGANIZATIONAL TROUBLESHOOTING PROCEDURES (Continued)

Table 4-2. Organizational Troubleshooting (Continued).

MALFUNCTION
  TESTING OR INSPECTION
    CORRECTIVE ACTION

16. Push bar will not connect to davit post push bar lugs. Inspect for:

Step 1. Bent push bar lugs on davit post.

Report condition to Direct Support Maintenance.

17. Jacking bracket pulleys will not turn. Inspect for:

Step 1. Bent pulley or shaft.

Report condition to Direct Support Maintenance.

18. Pin will not go through pin hole in safety chain lugs. Inspect for:

Step 1. Bent safety chain lugs.

Report condition to Direct Support Maintenance.

19. Rollers in rocking roller bind or will not turn. Inspect for:

Step 1. Evidence of dirt or other foreign material in rollers.

Disassemble, clean, lubricate and reassemble rollers. (See Maintenance Procedures.)

Step 2. Bent roller shaft.

Report condition to Direct Support Maintenance.

20. Hydraulic jack does not lift or hold position when operated. Inspect for:

Step 1. Release valve fouled or ram packing worn.

Step 2. Internal leakage.

Disassemble, clean, inspect, replace worn or damaged parts, and reassemble. Top up with MIL-L-7870A only. (See Maintenance Procedures.)

4-6. MAINTENANCE PROCEDURES

a. All components must be cleaned and inspected at regular intervals. If any cracks or damage are noted, items must be repaired at authorized level of maintenance.

b. Periodic inspection by an authorized inspector will be carried out at regular intervals. Visual inspection of all link and launching components will be made by competent individual following each bridge mission.

CAUTION

Link primary components are highly stressed and early detection of crack damage is most important. Delay in detection of cracks may result in complete failure of a component.

c. Link set shall be withdrawn from service semi-annually, for a full inspection.

d. For welding refer to TM 5-5420-212-12 Chapter 4 Section IV.

4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS

NOTE

During inspections, pay particular attention to all welds, top and bottom chords of highly stressed components and all connectors and lugs.

TASK	PROCEDURE	PAGE
1	ANCHOR ASSEMBLY	4-13
2	FOOT WALK	4-14
3	FOOT WALK POST	4-15
4	FOOT WALK BEARER	4-16
5	POST TENSIONING ASSEMBLY	4-17
6	REINFORCING LINK (SHORT AND LONG)	4-18
7	DAVIT POST	4-19
8	JACKING BRACKET	4-20
9	PINS	4-21
10	BRIDGING CAPSILL	4-22
11	ROCKING ROLLER	4-23
12	PUSH BAR (LONG)	4-24
13	HYDRAULIC JACK (20 TON)	4-25
14	GUARD ROPE, LIGHT, AND ANTI-FLUTTER TACKLE	4-38

4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(1) ANCHOR ASSEMBLY

This task covers:

a. Inspection
b. Repair

INITIAL SETUP

Material/Parts

NONE

Condition Description

Assembly removed from bridge or pallet load.

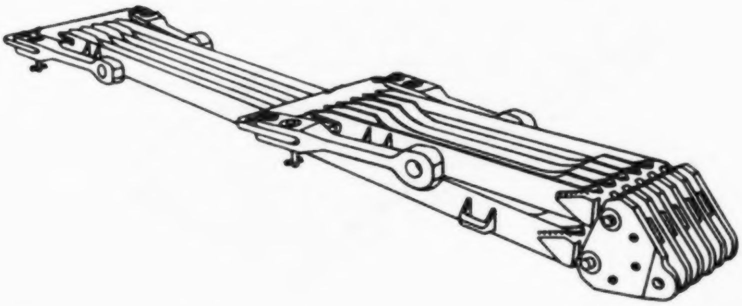
Tools

NONE

Personnel Required

62B Construction Equipment Repairman

LOCATION/ITEM	ACTION	REMARKS
INSPECTION		
	Inspect assembly for cracks, dents, broken or cracked connectors and brackets.	
REPAIR		
	1. Replace defective assembly with serviceable assembly.	
	2. Report full details of assembly damage to DS maintenance.	



4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(2) FOOTWALK

This task covers:

a. Inspection b. Repair

INITIAL SETUP

Materials/Parts	Condition Description
NONE	Footwalk removed from bridge or pallet load.

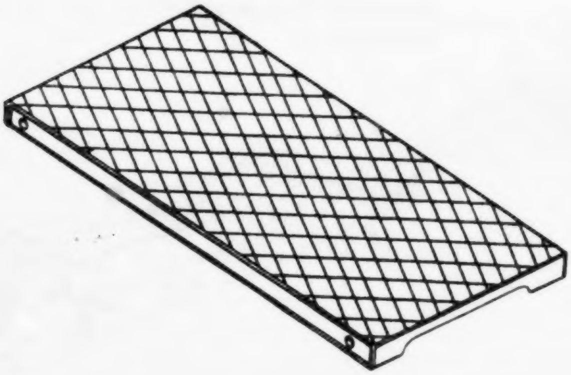
Tools

NONE

Personnel Required

62B Construction Equipment Repairman

LOCATION/ITEM	ACTION	REMARKS
INSPECTION		
	Inspect footwalk for cracks, and breaks.	
REPAIR		
	1. Replace defective unit with serviceable unit.	
	2. Report full details of footwalk damage to DS maintenance.	



4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(3) FOOTWALK POST

This task covers:

a. Inspection b. Repair

INITIAL SETUP

Materials/Parts	Condition Description
NONE	Post removed from bridge or pallet load.

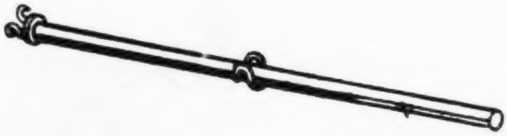
Tools

NONE

Personnel Required

62B Construction Equipment Repairman

LOCATION/ITEM	ACTION	REMARKS
INSPECTION		
	Inspect post for cracks, dents, and broken or cracked connectors.	
REPAIR		
	1. Replace defective post with serviceable post.	
	2. Report full details of post damage to DS maintenance.	



4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(4) FOOTWALK BEARER

This task covers:

a. Inspection b. Repair

INITIAL SETUP

Materials/Parts

NONE

Condition Description

Bearer removed from bridge or pallet load.

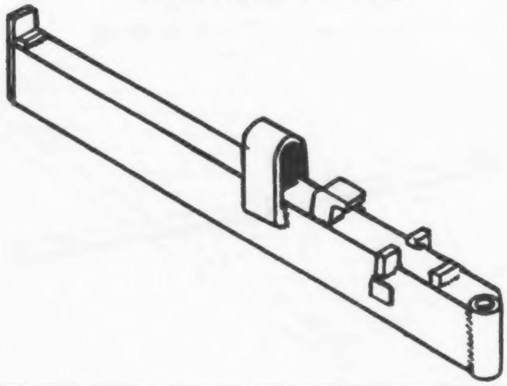
Tools

NONE

Personnel Required

62B Construction Equipment Repairman

LOCATION/ITEM	ACTION	REMARKS
INSPECTION	Inspect bearer for cracks, dents, broken or cracked connectors and lugs, and broken welds.	
REPAIR	1. Replace defective bearer with serviceable unit. 2. Report full details of bearer to DS maintenance.	



4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(5) POST TENSIONING ASSEMBLY

This task covers:

a. Inspection
b. Repair

INITIAL SETUP

Materials/Parts	Condition Description
NONE	Tensioning assembly removed from bridge or pallet load.

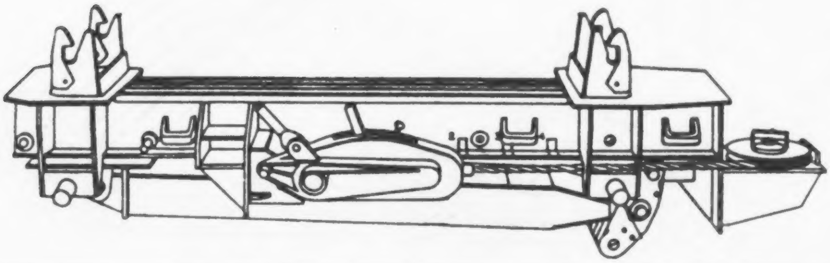
Tools

NONE

Personnel Required

62B Construction Equipment Repairman

LOCATION/ITEM	ACTION	REMARKS
INSPECTION	Inspect tensioning assembly for cracks, dents, broken or cracked connectors and brackets, and binding operation of pulley and sliding block.	
REPAIR	1. Replace defective tensioning assembly with serviceable assembly. 2. Report full details of tensioning assembly damage to DS maintenance.	



4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(6) REINFORCING LINK (SHORT AND LONG)

This task covers:

a. Inspection b. Repair

INITIAL SETUP

Materials/Parts	Condition Description
NONE	Link removed from bridge or pallet load.

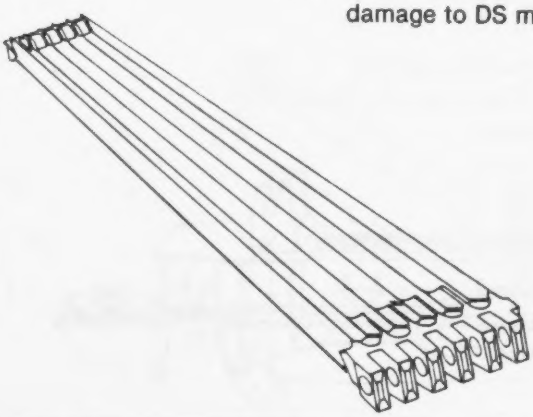
Tools

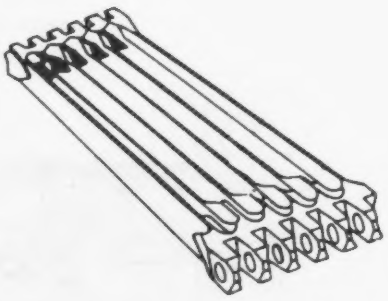
NONE

Personnel Required

62B Construction Equipment Repairman

LOCATION/ITEM	ACTION	REMARKS
INSPECTION	Inspect reinforcing link for cracks, breaks, broken or cracked connectors, and cracked welds.	
REPAIR	1. Replace defective link with serviceable link. 2. Report full details of link damage to DS maintenance.	





4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(7) DAVIT POST

This task covers:

a. Inspection b. Repair

INITIAL SETUP

Materials/Parts

NONE

Tools

NONE

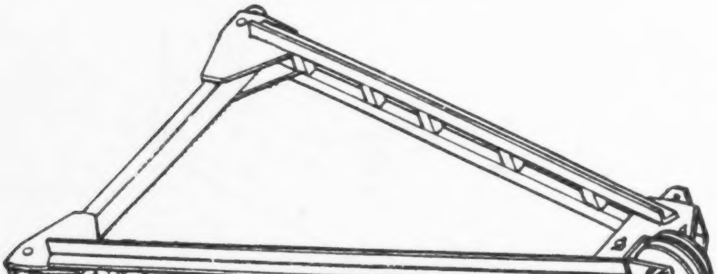
Personnel Required

62B Construction Equipment Repairman

Condition Description

Davit post removed from bridge or pallet load.

LOCATION/ITEM	ACTION	REMARKS
INSPECTION	Inspect davit post for cracks, dents, holes, broken or cracked connectors, brackets and spacers, cracked welds, missing chains, and bent levelling screws.	
REPAIR	1. Replace defective davit post with serviceable post. 2. Report full details of post damage to DS maintenance.	



4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(8) JACKING BRACKET

This task covers:

a. Inspection b. Repair

INITIAL SETUP

Materials/Parts	Condition Description
NONE	Jacking bracket removed from bridge or pallet load.

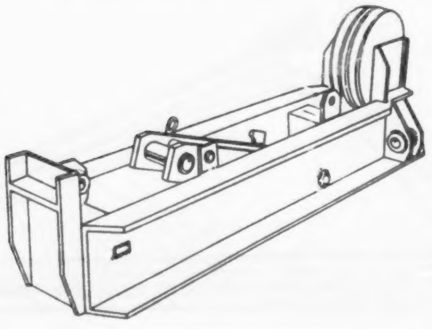
Tools

NONE

Personnel Required

62B Construction Equipment Repairman

LOCATION/ITEM	ACTION	REMARKS
INSPECTION		
	Inspect jacking bracket for cracks, breaks, broken or cracked connectors and brackets.	
REPAIR		
	1. Replace defective jacking bracket with serviceable bracket.	
	2. Report full details of bracket damage to DS maintenance.	



4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(9) PINS

This task covers:

a. Inspection
b. Repair

INITIAL SETUP

Materials/Parts	Condition Description
NONE	Pins removed from bridge or basket load.

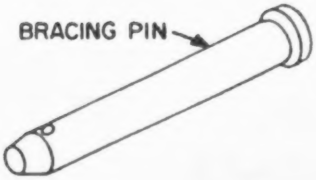
Tools

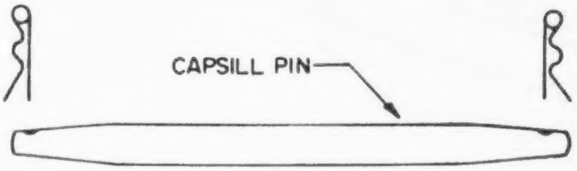
NONE

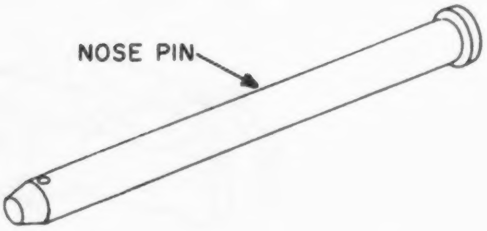
Personnel Required

62B Construction Equipment Repairman

LOCATION/ITEM	ACTION	REMARKS
INSPECTION		
	Inspect pins for wear, distortion and breaks.	
REPAIR		
	1. Replace defective pin with serviceable pin.	
	2. Report full details of pin damage to DS maintenance.	







4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(10) BRIDGING CAPSILL

This task covers:

a. Inspection b. Repair

INITIAL SETUP

Materials/Parts

NONE

Condition Description

Capsill removed from bridge or pallet load.

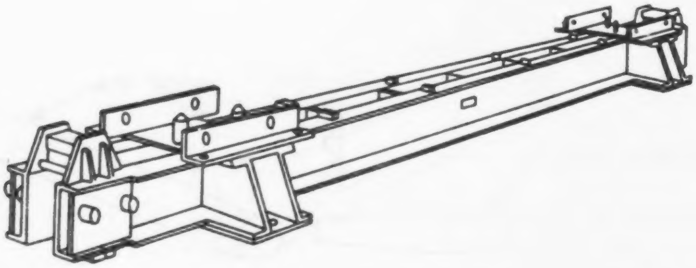
Tools

NONE

Personnel Required

62B Construction Equipment Repairman

LOCATION/ITEM	ACTION	REMARKS
INSPECTION		
	Inspect capsill for cracks, breaks dents, cracked or broken connectors and brackets.	
REPAIR		
	1. Replace defective capsill with serviceable capsill.	
	2. Report full details of capsill damage to DS maintenance.	



4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(11) ROCKING ROLLER

INITIAL SETUP

Materials/Parts	Condition Description
NONE	Rocking roller removed from bridge or pallet load.

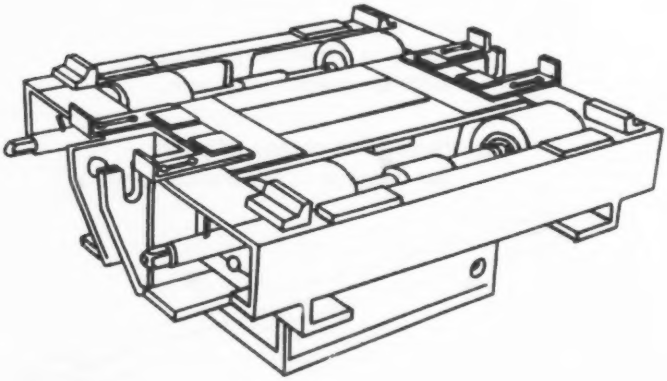
Tools

NONE

Personnel Required

62B Construction Equipment Repairman

LOCATION/ITEM	ACTION	REMARKS
INSPECTION		
	Inspect roller for cracks and breaks, dents, binding, missing or broken connectors and brackets.	
REPAIR		
	1. Replace defective roller with serviceable roller.	
	2. Report full details of roller damage to DS maintenance.	



4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(12) PUSH BAR (LONG)

This task covers:

a. Inspection b. Repair

INITIAL SETUP

Materials/Parts	Condition Description
NONE	Push bar disconnected from truck and bridge.

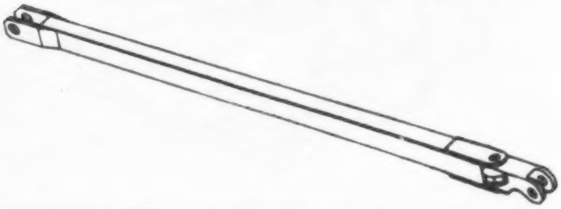
Tools

NONE

Personnel Required

62B Construction Equipment Repairman

LOCATION/ITEM	ACTION	REMARKS
INSPECTION	Inspect push bar for cracks, breaks and distortion. CAUTION **Do not apply heat or straighten by the use of a hammer.**	
REPAIR	1. Replace defective push bar with serviceable-like item. 2. Report full details of push bar damage to DS maintenance.	



4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(13) HYDRAULIC JACK

This task covers:

a. Inspection b. Repair c. Service

INITIAL SETUP

Materials/Parts	Condition Description
Lubricating Oil MIL-L-7870A	Jack removed from pallet load

Tools

General Mechanics Tool Kit
Air Compressor w/Accessories
Protective Goggles

Personnel Required

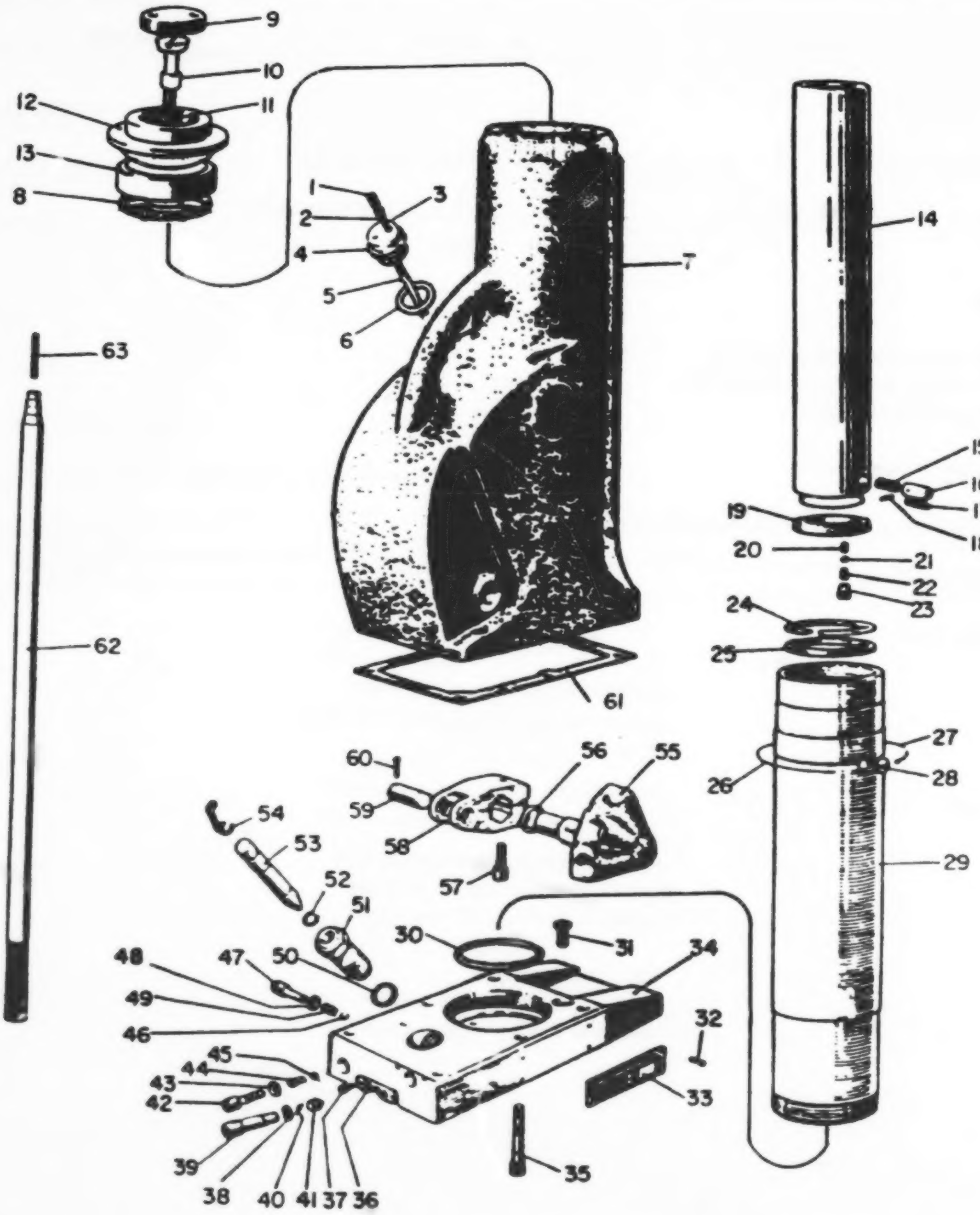
62B Construction Equipment Repairman

LOCATION/ITEM	ACTION	REMARKS
INSPECTION		
	Inspect hydraulic jack for leaks, cracks, breaks, damaged or missing parts.	
REPAIR		
	Repair consists of removing bad parts and replacing serviceable parts.	
	a. Disassembly	

4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(13) HYDRAULIC JACK (Continued)

LOCATION/ITEM	ACTION	REMARKS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4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(13) HYDRAULIC JACK (Continued).

1. Retaining screw
2. Valve spring
3. Valve ball
4. Filler cap
5. Dipstick
6. Seal washer
7. Housing
8. Housing seal 'O' ring
9. Retainer plate
10. Cap pin
11. Lock washer
12. Swivel cradle
13. Swivel head seating
14. Ram
15. Trigger guide spring
16. Trigger guide
17. Trip valve trigger
18. Tripper fulcrum pin
19. Ram packing
20. Trip valve lifter pin
21. Trip valve ball
22. Trip valve spring
23. Trip valve cage
24. Ram wiper retaining wire
27. Liner valve spring
28. Liner valve
29. Liner
30. Liner seal 'O' ring
31. Suction filter
32. Nameplate screws
33. Nameplate
34. Base
35. Base screw
36. Release valve instruction plate
37. Release valve plate screws
38. Release valve seal 'O' ring

4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(13) HYDRAULIC JACK (Continued).

39. Release valve screw
40. Release valve tip
41. Release valve tip securing pin
42. Delivery valve screw
43. Delivery valve seal
44. Delivery valve spring
45. Delivery ball valve
46. Suction ball valve
47. Suction valve screw
48. Suction valve seal
49. Suction valve spring
50. Pump barrel seal
51. Pump barrel
52. Pump plunger seal
53. Pump plunger
54. Pump plunger clip
55. Quadrant
56. Quadrant shaft seal 'O' ring
57. Tumbler pinch screw
58. Tumbler
59. Tumbler roller
60. Tumbler roller split pin
61. Reservoir gasket
62. Operating lever
63. Operating key

4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(13) HYDRAULIC JACK (Continued)

LOCATION/ITEM	ACTION	REMARKS
REPAIR (Continued)		

CAUTION

Special care must be taken when disassembling components to ensure freedom from grit, etc. Valve seats and mating surfaces must be kept free from scratches and other damage.

(1) Loosen release valve screw (39) 1-1/2 turns and press ram down as far as it will go.

(2) Remove filler cap (4) and inspect seal washer (6).

WARNING

When using compressed air, wear safety goggles or glasses and ensure air blast is not directed toward another person.

(3) Remove screws (1), springs (2) and balls (3); blow through valve with compressed air.

4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(13) HYDRAULIC JACK (Continued)

LOCATION/ITEM	ACTION	REMARKS
REPAIR (Continued)		
	(4) Drain oil into suitable container, approximately 2-5/8 pints (1-1/2 liters).	
	(5) Remove and inspect retainer plate (9), cap pin (10), swivel cradle (12) and swivel head seating (13).	
	(6) Remove release valve instruction plate (36).	
	(7) Remove release valve screw (39).	
	(8) Remove release valve seal (38) and inspect.	
	(9) Remove release valve tip securing pin (40) and inspect for burrs.	
	(10) Remove release valve tip (41) and inspect for damage.	

4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(13) HYDRAULIC JACK (Continued)

LOCATION/ITEM	ACTION	REMARKS
REPAIR (Continued)		
	(11) Remove and inspect delivery valve screw (42), seal (43), spring (44) and valve (45).	
	(12) Remove and inspect suction valve screw (47), seal (48), spring (49), and valve (46).	
	(13) Remove base screw (35) and inspect threads and hexagon sockets for distortion.	
	(14) Using aluminum or hardwood block, tap the top of the liner (29) down approximately 3/4 inch.	
	(15) Put hand inside housing and release pump plunger clip (54) from over tumbler roller (59).	
	(16) Rotate tumbler (61) assembly upwards.	

4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(13) HYDRAULIC JACK (Continued)

LOCATION/ITEM	ACTION	REMARKS
REPAIR (Continued)		
	(17) Press pump plunger (53) down into pump barrel (51).	
	(18) Housing (7) will now be free to lift off liner (29) and inspect reservoir gasket (61), housing seal (8), seating and liner hole. Ensure that pump plunger clip (54) has retaining wire around it.	
	(19) Loosen tumbler pinch screw (57).	
	(20) Pull out pump quadrant shaft (55) and inspect O-ring seal (56), shaft hole in housing and quadrant	
	(21) Remove tumbler roller (59) and tumbler (58) and inspect.	

WARNING

When using compressed air, wear safety goggles or glasses and ensure air blast is not directed toward another person.

4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(13) HYDRAULIC JACK (Continued)

LOCATION/ITEM	ACTION	REMARKS
REPAIR (Continued)		
	(22) Remove liner valve (28), spring (27) and retaining wire (26) and blow through liner with compressed air.	
	(23) Remove pump plunger (53), inspect seal (52), and plunger body for scoring.	
	(24) Remove pump barrel (51), inspect O-ring seal (50), and barrel bore for scoring.	
	(25) Remove suction filter (31) and clean.	
	(26) To remove base (34), grasp liner (29), in vise with soft jaws, or in a strap wrench, and tap base with aluminum or hardwood block (right hand thread).	
	(27) Inspect liner (29) and liner seal O-ring (30).	

4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(13) HYDRAULIC JACK (Continued)

LOCATION/ITEM	ACTION	REMARKS
REPAIR (Continued)		

WARNING

When using compressed air, wear safety goggles or glasses and ensure air blast is not directed toward another person.

(28) Blow through base oil-ways with compressed air.

(29) Inspect all seals and valve seats for damage.

(30) Push ram (14) out of bottom of liner (29) and inspect.

(31) Remove and inspect ram wiper (25).

(32) Remove and inspect trip valve cage (23), spring (22), ball (21), and lifter pin (20).

(33) Remove trigger guide (16) and inspect for scoring.

(34) Remove trip valve trigger (17) and inspect for nose wear.

4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(13) HYDRAULIC JACK (Continued)

LOCATION/ITEM	ACTION	REMARKS
REPAIR (Continued)		
	(35) Remove trigger fulcrum pin (18) and inspect.	
	(36) Remove trigger guide spring (15) and inspect.	
	WARNING **When using compressed air, wear safety goggles or glasses and ensure air blast is not directed toward another person.**	
	(37) Blow out valve with compressed air.	
	(38) Remove and inspect ram packing (19).	
	(39) Inspect ram for scoring and trip valve groove for damage.	
	b. Assembly. Reassemble in reverse order of disassembly and the following:	
	(1) When assembling components, smear bearing surfaces and seals with hydraulic oil, MIL-L-7078A to prevent initial scuffing.	

4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(13) HYDRAULIC JACK (Continued)

LOCATION/ITEM	ACTION	REMARKS
REPAIR (Continued)		
	(2) Ensure that trigger guide (16) is assembled with cut out at the bottom, i.e., ram packing (19) end of ram (14).	
	(3) Ensure that trip valve trigger (17) has the 30-degree angle face to the bottom of ram (14).	
	(4) Ensure that trip valve lifter pin (20) has the flat end resting on the trip valve ball (21).	
	(5) Ensure that ram wiper (25) internal angle face is facing the bottom of liner (29). Insert ram (14) from bottom of liner (29).	
	(6) When assembling the tumbler (58) in the housing (7), ensure that the shaft is in the correct angular position and locate the tumbler (58) on the shaft to allow axial movement of approximately 0.020 in (0.5 mm).	
	(7) When refitting housing (7), ensure that pump plunger clip (54) is to the outside of tumbler roller (59).	
	(8) Springs on the suction and delivery valves are to be assembled with the smaller diameter end next to the ball.	

4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(13) HYDRAULIC JACK (Continued)

LOCATION/ITEM	ACTION	REMARKS
REPAIR (Continued)		
	(9) Replace lockwasher (11) on cap pin (10).	
	(10) Do not overtighten housing. Housing is of cast aluminum alloy construction. This material is prone to cracking if over tightened.	
	(11) Fill to level indicated on dipstick with fresh clean hydraulic oil MIL-L-7078A only. After refilling, remove any air which may be trapped in the system as follows:	
	(12) Operate pump until ram has risen two to three inches.	
	(13) Unscrew release valve screw no more than 1-1/2 turns.	
	(14) Press ram down as far as it will go. Repeat these operations five times.	
	c. Testing. Each jack shall be tested. Use the operating lever supplied to lift and lower an 18 ton load over the complete range of movement.	
SERVICE		
	Service by checking fluid level and filling to capacity of 2-5/8 pints (1-1/2 liters). Refer to paragraph 4-7 for service. **NOTE** **Reservoir filler cap incorporates a dipstick for gaging the fluid level.**	

4-7. MAINTENANCE OF LINK REINFORCEMENT SET COMPONENTS (Continued)

(14) GUARD ROPE, LIGHT AND ANTI-FLUTTER TACKLE

This task covers:

a. Inspection
b. Repair

INITIAL SETUP

Materials/Parts

NONE

Tools

None

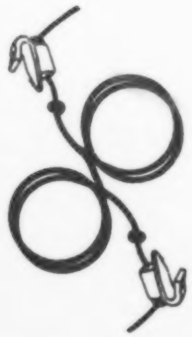
Personnel Required

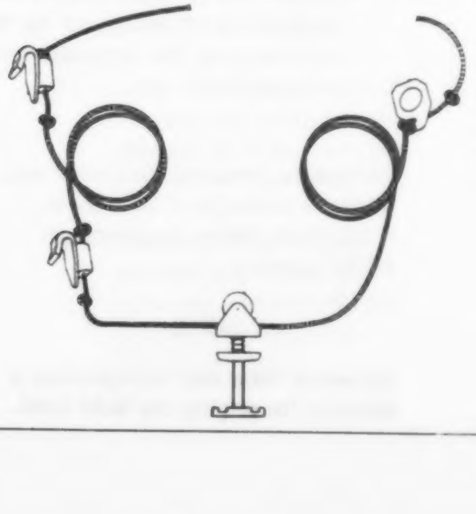
62B Construction Equipment Repairman

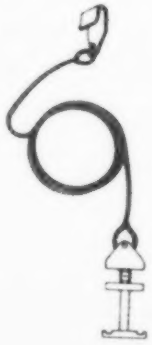
Condition Description

Components removed from bridge or pallet load.

LOCATION/ITEM	ACTION	REMARKS
INSPECTION	Inspect components for cracks, breaks, broken connectors, fraying rope, and binding operation of pulleys or toggle bars.	
REPAIR	1. Replace defective component with serviceable component. 2. Report full details of damage to DS maintenance.	







APPENDIX A

REFERENCES

A-1. Lubrication

C9100IL	Identification List of Fuels, Lubricants, Oils and Waxes
LO 9-2320-260-12	Lubrication Order: 5-Ton, 6 x 6, Truck, M817
LO 9-2330-287-14	Bolster Trailers: 4-Ton, 4-Wheel, M-196

A-2. Maintenance

TM 5-232	Elements of Surveying
TM 5-312	Military Fixed Bridges
TM 5-5450-11	Air Transport of Supplies and Equipment: Helicopter External Loads Rigged with Air Delivery Equipment
TM 5-725	Rigging
TM 9-2320-260-10	Operators Manual: 5-Ton, 6 x 6, Truck, M817
TM 9-2330-287-14	Bolster Trailers: 4-Ton, 4-Wheel, M796
DA Pamphlet 738-750	The Army Maintenance Management Systems

A-3. Painting

TM 43-0139	Painting Instructions for Field Use

A-4. Shipment and Storage

TM 740-90-1	Administrative Storage of Equipment
TM 746-185	Procedures for Rapid Deployment and Retrograde for Military Bridging

A-5. Destruction of Materiel to Prevent Enemy Use

TM 750-244-3	Procedures for Destruction of Equipment to Prevent Enemy Use

A-6. Field Data

FM 5-34	Engineer Field Data Manual

APPENDIX B

MAINTENANCE ALLOCATION CHART

SECTION I. INTRODUCTION

B-1. GENERAL

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibilities for the performance of maintenance functions on the identified end item or component and the work measurement time required to perform the functions by the designated maintenance level. The implementation of maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the tools and test equipment required for each maintenance function as referenced from Section II.

B-2. EXPLANATION OF COLUMNS IN SECTION II

a. Column (1), Group Number. Column 1 lists group numbers to identify related components, assemblies, subassemblies, and modules with their next higher assembly. The applicable groups are listed in the MAC in disassembly sequence beginning with the first group removed.

b. Column (2), Component/Assembly. This column contains the noun names of components, assemblies, subassemblies and modules for which maintenance is authorized.

c. Column (3), Maintenance Functions. This column lists the functions to be performed on the item listed in Column 2. The maintenance functions are defined as follows:

(1) Inspect. To determine seviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

(2) Test. To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

(3) Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

(4) Adjust. To maintain within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

(5) Align. To adjust specified variable elements of an item to bridge about optimum or desired performance.

(6) Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

(7) Install. The act of emplacing, seating, or fixing into position an item, part of module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

(8) Replace. The act of substituting a serviceable like type part, subassembly, or module (compnent or assembly) for an unserviceable counterpart.

(9) Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, or replace) or other maintenance actions (welding, grinding, reveting, straightening, facing, remachining or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item or system.

(10) Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to a like new condition.

(11) Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc) considered in classifying Army equipment/components.

d. Column (4), Maintenance Category. This column is made up of subcolumns for each category of maintenance. Work time figures are listed in these subcolumns for the lowest level of maintenance authorized to perform the function listed in Column 3. These figures indicate the average active time required to perform the maintenance under typical field operating conditions.

e. Column (5), Tools and Equipment. This column is provided for referencing by code the common tool sets (not individual tools), special tools, test and support equipment required to perform the designated functions.

Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
00	Anchor Assembly	Inspect	0.2						
		Service	0.1						
		Replace	2.0						
01	Footwalk Assembly								
0101	Footwalk	Inspect	0.1						
		Replace	0.5						
		Repair		1.0					1-A
0102	Footwalk Post	Inspect	0.1						
		Replace	0.5						
		Repair		1.0					1-A
0103	Footwalk Bearer	Inspect	0.1						
		Replace	0.5						
		Repair		1.0					1-A
0104	Guard Rope	Inspect	0.1						
		Replace	0.1						
02	Post Tensioning Assembly								
0201	Post	Inspect	0.1						
		Service	0.1						
		Replace	0.5						
0202	Tackle Block	Inspect	0.1						
		Service	0.1						
		Replace	0.5						
0203	Cable Puller	Inspect	0.1						
		Service	3.0						
		Replace	0.5						
0204	Link Connecting Block	Inspect	0.1						
		Replace	2.0						
03	Long Reinforcing Link	Inspect	0.1						
		Replace	1.0						
		Repair		1.0					1-A

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Section II. MAINTENANCE ALLOCATION CHART

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
04	Short Reinforcing Link	Inspect	0.1						
		Replace	1.0						
		Repair		1.0					1-A
05	Davit Post Assembly								
0501	Levelling Screws	Inspect	0.1						
		Service	0.1						
		Replace	0.1						
0502	Pulleys	Inspect	0.1						
		Service	0.1						
		Replace		0.5					
06	Jacking Bracket								
0601	Pulleys	Inspect	0.1						
		Service	0.1						
		Replace		0.5					
0602	Link	Inspect	0.2						
07	Pins (bracing, nose, anchorage and capsill)	Inspect	0.1						
		Service	0.1						
		Replace	0.2						
08	Anti-flutter Tackle	Inspect	0.1						
		Replace	0.2						
09	Light Tackle	Inspect	0.1						
		Replace	0.1						
10	Hydraulic Jack (20 Ton)	Inspect	0.1						
		Service	0.1						
		Repair		1.0					
11	Push Bar (long)	Inspect	0.1						
		Repair		0.5					1-A

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) Reference code	(2) Maintenance Category	(3) Nomenclature	(4) National Stock Number (NSN)	(5) Tool number
1	0	Welding Set, Arc, Inert Gas Shield LIN Y48323	3431-00-691-1415	SP9, w/ CVS-2 (88725)

Section IV. REMARKS

Reference code	Remarks
1-A	Repair by welding. Welding is restricted where structural strength is effected.

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

SECTION I. INTRODUCTION

C-1. SCOPE

This appendix lists components of end item and basic issue items for the Medium Girder bridge (MGB) to help you inventory items required for safe and efficient operation.

C-2. GENERAL

The Components of End Item and Basic Issue Items List is divided into the following sections:

a. Section II. Components of End Item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of (or in the case of the link reinforcement set, auxiliary equipment used with) the end item, but are removed and/or separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items. The link reinforcement set is listed in Section II, but it is not a component of the end item. The LRS is an item that is used with the MGB and is considered auxiliary equipment. The listing for the LRS is for informational purposes only, and is not authority to requisition the set or any part of the set.

b. Section III. Basic Issue Items. These are the minimum essential items required to place the MGB in operation, to operate it, and to perform emergency repairs. Although shipped separately packaged, CII must be with the MGB during operation and whenever it is transferred between property accounts. The illustrations will assist you with hard-to-identify items. This manual is your authority to request /requisition replacement CII, based on TOE/MTOE authorization of the end item.

C-3. EXPLANATION OF COLUMNS

The following provides an explanation of columns found in the tabular listings:

a. Column (1) - Illustration Number (Illus Number). This column indicates the number of the illustration in which the item is shown.

b. Column (2) - National Stock Number. Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

c. Column (3) - Description. Indicates the Federal item and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number.

d. Column (4) - Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr).

e. Column (5) - Quantity required (Qty rqr). Indicates the quantity of the item authorized to be used with/on the equipment.

Section II. COMPONENTS OF END ITEM

(Not Applicable)

Section III. BASIC ISSUE ITEMS

(Not Applicable)

APPENDIX D

ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

D-1. SCOPE

This appendix lists additional items you are authorized for the support of the Medium Girder Bridge.

D-2. GENERAL

This list identifies items that do not have to accompany the Medium Girder Bridge and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

D-3. EXPLANATION OF COLUMNS

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name under the typed document (i.e., CTA,MTOE, TDA, or JTA) which authorizes the item(s) to you.

The following provides an explanation of columns found in the tabular listings:

a. Column (1) - National Stock Number. Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

b. Column (2) - Description. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number.

c. Column (3) - Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr)

d. Column (4) - Quantity authorized (QTY AUTH). Indicates the quantity of the item authorized to be used with/on the equipment.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION FSCM & PART NUMBER	 USABLE ON CODE	(3) U/M	(4) QTY AUTH
	MTOE AUTHORIZED ITEM			
	CTA AUTHORIZED ITEMS			

APPENDIX E
EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

E-1. SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the Medium Girder Bridge. These items are authorized to you by CTA - , Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

E-2. EXPLANATION OF COLUMNS

a. Column (1) - Item number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify materials.

b. Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew
O - Organizational Maintenance

c. Column (3) - National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column (4) - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

e. Column (5) - Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
(1)	C	9150-00-190-0907	Grease, Automotive and Artillery (GAA), (81349), MIL-G-10924	LB
(2)	C	9150-00-263-3940	Oil, Lubricating, General Purpose, Low Temp., MIL-L-7870A	GL
(3)	C	8030-00-850-7076	Coating Compound, Metal Pretreatment	GL
(4)	C	8010-00-298-2284	Primer Coating, Pherolic Resin	GL
(5)	C	8010-01-094-8425	Enamel, Alkyd, Camouflage, Forest Green	GL
(6)	C	8010-00-378-4339	Enamel, Lusterless, White	GL
(7)	C	5610-00-141-7838	Walkway compound, Olive Drab	GL
(8)	C	6810-00-664-0387	Cleaning Solvent	GL
(9)	C	5510-00-960-7325	Lumber, Softwood, 3 in x 8 in x 14 ft (40 req'd), to be cut into lengths required for use as packing: 3 in x 8 in x 36 in (144 pcs) 3 in x 8 in x 84 in (4 pcs)	EA

GLOSSARY

ABBREVIATIONS AND TERMS USED IN TABLE.

AA = Anchor Assembly

AA(L) = Anchor Assembly (the long link of the assembly)

AA(S) = Anchor Assembly (the short link of the assembly)

AF = Anti-flutter Tackle

CG = Center of Gravity

CRB = Capsill Roller Beam

E = End of Bridge

FRB = Front Roller Beam

LLN = Light Launching Nose

LRB = Launching Roller Beam

LT = Light Tackle

LZ = Landing Zone

PT = Post Tensioning Assembly

RRB = Rear Roller Beam

1LL = 1 Long Link

1SL = 1 Short Link

6N1, 7N1, and 8N1 = Types of single story nose construction. The first number indicates the number of heavy nose sections used. N1 means nose single story.

6N1 + 3N2 = Type of double story nose construction. 6N1 is explained above. 3N2 means three heavy nose sections used in second story. N2 means nose double story.

2 + 3 + or 8 thru 10 = Describes number of bays to be added. 2 + 3 +, add 2nd and 3rd bay. 8 thru 10, add bays 8 thru 10.

Boom to = Movement of bridge until the panel point given is over the RRB.

Launch to = Movement of bridge until the panel point given is over the LRB/CRB.
Delaunch to

3D, 8D, 20D, 27D, and 37D = Counterweight codes giving the number of deck units required.

(4p0), (2p4), and (Bp3) = Examples of the way that the center of gravity is shown.

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JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

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PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
6	2-1 a			In line 6 of paragraph 2-1a the manual states the engine has 6 Cylinders. The engine on my set only has 4 Cylinders. Change the manual to show 4 Cylinders.
81		4-3		Callout 16 on figure 4-3 is pointing at a bolt. In key to figure 4-3, item 16 is called a shim - Please correct one or the other.
125	line 20			I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered, so the NSN is wrong. Please give me a good NSN

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TEAR ALONG PERFORATED LINE

FILL IN YOUR
UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

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COMMANDER
US ARMY TROOP SUPPORT COMMAND
ATTN: AMSTR-MPS
4300 GOODFELLOW BOULEVARD
ST. LOUIS, MO 63120-1798

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*
inches	centimeters	2.540
feet	meters	.305
yards	meters	.914
miles	kilometers	1.609
square inches	square centimeters	6.451
square feet	square meters	.093
square yards	square meters	.836
square miles	square kilometers	2.590
acres	square hectometers	.405
cubic feet	cubic meters	.028
cubic yards	cubic meters	.765
fluid ounces	milliliters	29,573
pints	liters	.473
quarts	liters	.946
gallons	liters	3.785
ounces	grams	28.349
pounds	kilograms	.454
short tons	metric tons	.907
pound-feet	newton-meters	1.365
pound-inches	mewton-meters	.11375

To change	*To*	*Multiply by*
ounce-inches	newton-meters	.007062
centimeters	inches	.394
meters	feet	3.280
meters	yards	1.094
kilometers	miles	.621
square centimeters	square inches	.155
square meters	square feet	10.764
square meters	square yards	1.196
square kilometers	square miles	.386
square hectometers	acres	2.471
cubic meters	cubic feet	35.315
cubic meters	cubic yards	1.308
milliliters	fluid ounces	.034
liters	pints	2.113
liters	quarts	1.057
liters	gallons	.264
grams	ounces	.035
kilograms	pounds	2.205
metric tons	short tons	1.102

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

PIN : 056556-000